

2017
PACIFIC NORTHWEST
FIRE NARRATIVE
DECEMBER 20, 2017
DRAFT



I. Overview of the 2017 Fire Season

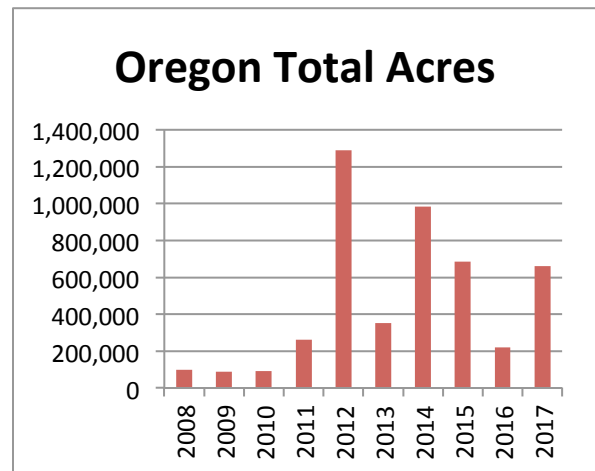
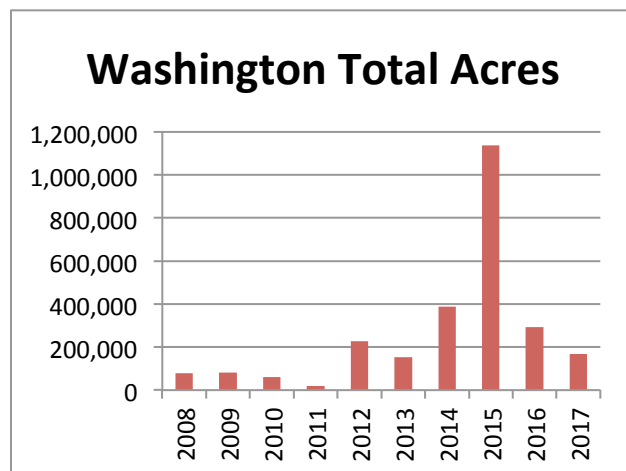
Introduction

This report summarizes the 2017 fire season for Region 6 (R6) of the Forest Service and the Oregon/Washington (OR/WA) State Office of the Bureau of Land Management (BLM). This report includes summary statistics for the fire season, preseason information, factors that affected the season (including duration, intensity, and resources), and a timeline of the 2017 fire season. The accompanying appendices provide more detail on the use of military resources (Appendix A), the fire prevention and mitigation program (Appendix B), the use of science and technology in managing wildfires (Appendix C), air quality and smoke management (Appendix D), actions taken before and during the August total solar eclipse (Appendix E), and more detailed discussion of specific fires by subgeographic area. Appendix F covers southwest Oregon, Appendix G the central Cascades, Appendix H southeast Oregon, Appendix I the Columbia River Gorge, Appendix J to Blue Mountains, and Appendix K covers Washington.

Basic Fire Statistics

Across Oregon and Washington, 3,712 fires burned 830,185 acres this season. The number of fires was only 91 percent of the 10-year average, but the number of acres burned was 113 percent, indicating that average fire size in 2017 was larger than average. This season can be ranked 6th highest in the last ten years in terms of number of large fires, and is 4th in terms of acres burned.

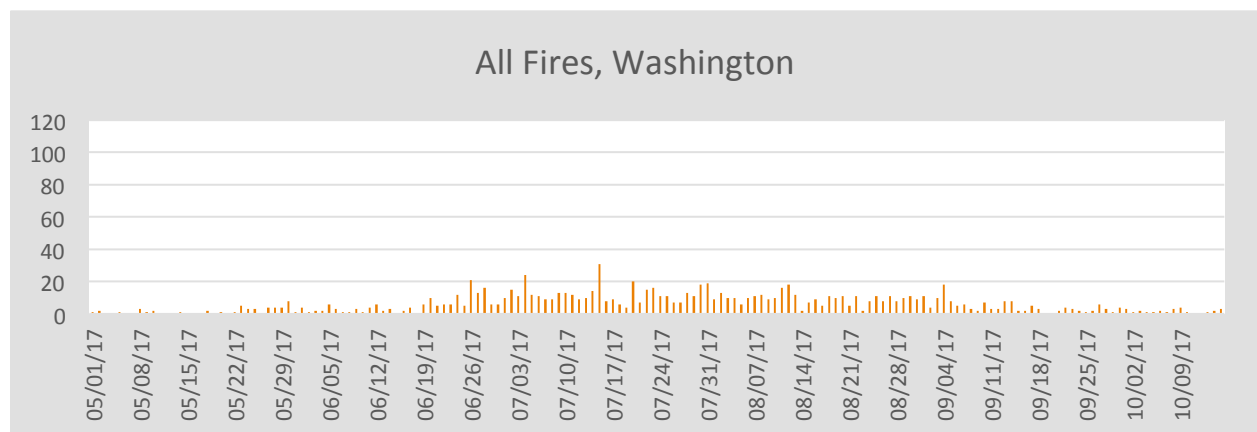
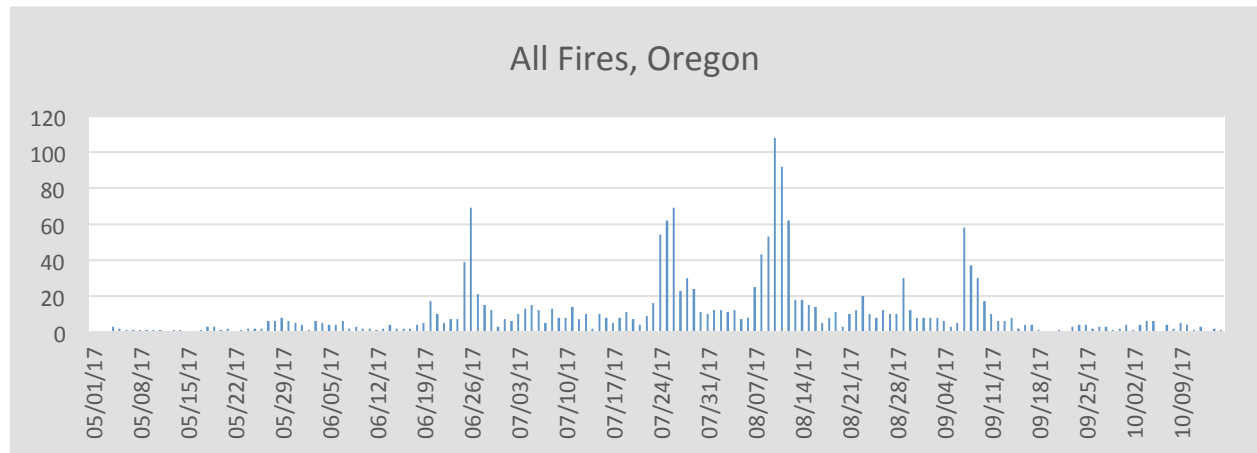
The 2017 fire season was more severe in more burned acres in Oregon than in Washington. As of early October, Washington experienced 1,293 fires (93 percent of the 10-year average) for 167,810 acres, or only 64 percent of the 10-year average (Figure xa). In contrast, Oregon had 2,027 fires (89 percent of the 10-year average) for 659,679 acres, or 139 percent of the 10-year average (Figure xb).



Initial attack was able to contain all but 126 of these fires for an initial attack success rate of 97 percent. The region experienced more human-caused fires than lightning-caused fires this year.

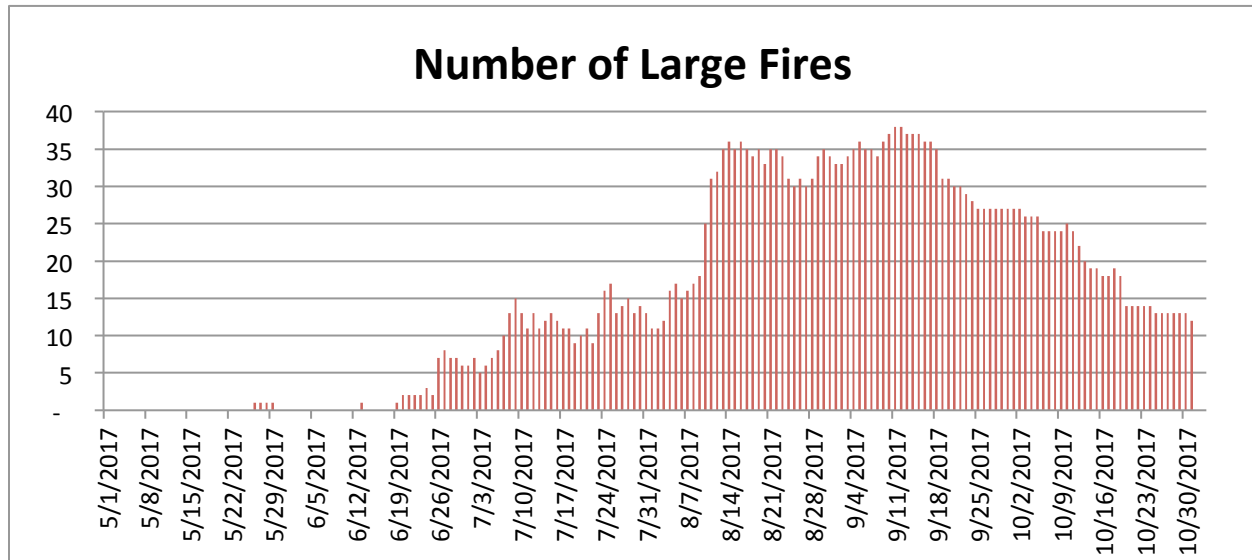
On National Forests, lightning accounts for about 60 percent of all starts, while on BLM-managed lands human-causes accounts for about 55 percent of ignitions. Across all jurisdictions, about 44 percent of all fires started on National Forest system lands while only 9 percent started on BLM-managed lands.

In Oregon, fire starts spiked during four periods – late June, late July, early-mid-August, and early September (Figure x). The greatest number of fires ignited on August 10, with 86 (out of 108) fires caused by lightning. Washington saw minor spikes in fire starts in late June, early July, and mid-July (Figure x). In both states, the number of human-caused fires was relatively steady through the summer with an average of 10 across the region during the summer months.



1 Large Fires

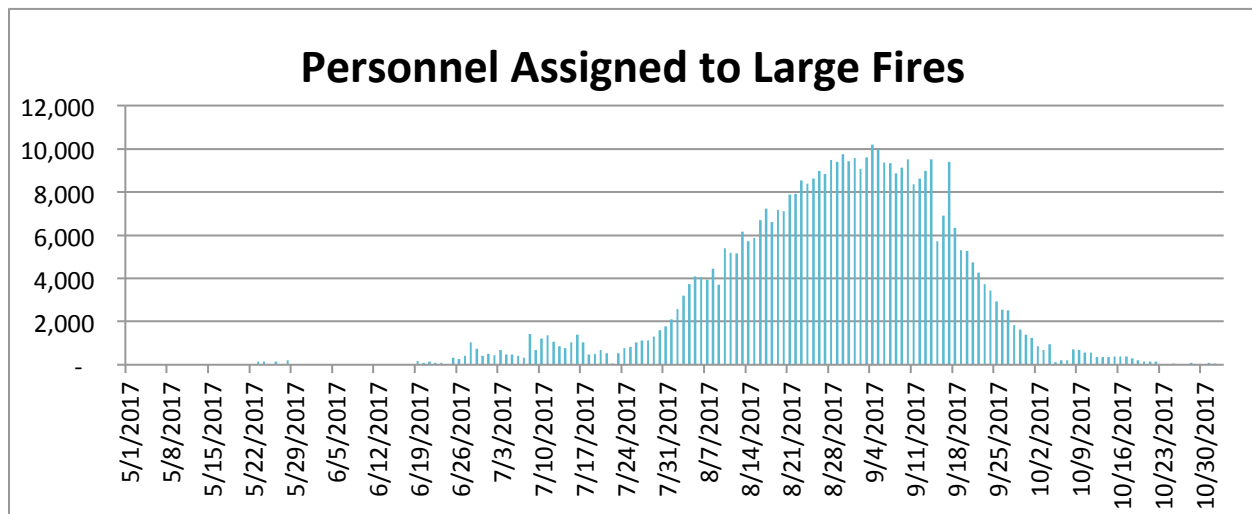
2 A large fire is one that burns at least 100 acres in forests or 300 acres in grass,
3 shrubs, or shrub-steppe (often referred to as "rangelands"). While there were one
4 or two large fires as early as late May, the number of large fires burning
5 simultaneously began increasing in late June and increased rapidly in August
6 (Figure x). Large fire occurrences peaked at 38 large fires on September 11-12. By
7 the end of October, 12 large fires were still active.



8

9

10 Managing large fires typically requires a large number of firefighting personnel and
11 other firefighting resources. More personnel are needed to manage large fires in
12 forests than in rangelands due to the types of fuels involved, typical fire behavior
13 and the overall duration of large forest fires. A long duration rangeland fire typically
14 lasts for about 2 weeks whereas a long duration forest fire typically lasts for several
15 weeks to several months. The number of personnel assigned to large fires follows a
16 similar pattern as the number of large fires, although tapering off sooner in fall. The
17 number of personnel assigned to large fires in the Northwest increased in August
18 and peaked on September 4 with an estimated 10,182 people assigned (Figure x).

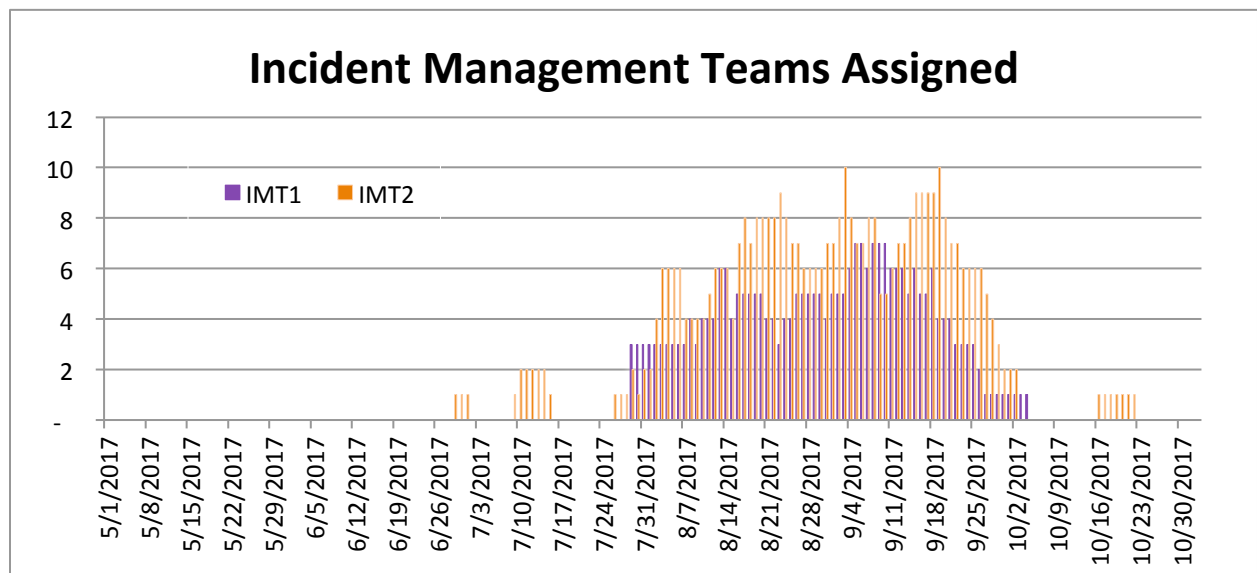


Large fires use incident management teams (IMTs) to:

- Order and assign firefighting resources to specific locations on each fire in order to perform specific tasks (Operations),
- Develop daily plans for managing the fire, order and release firefighting resources (Plans),
- Track and report costs and claims (Finance), and
- Provide the infrastructure needed for the fire and the firefighters such as communications, food, sanitation, transportation to and from the fireline, showers, and other supplies (Logistics).

In addition, IMT information officers gather, draft and publish fire updates and fire information for the media and the public. As fire representatives, they are the primary source of fire information and updates. They work to disseminate information to the media and the affected communities through traditional print media and through social media channels (Fire Information).

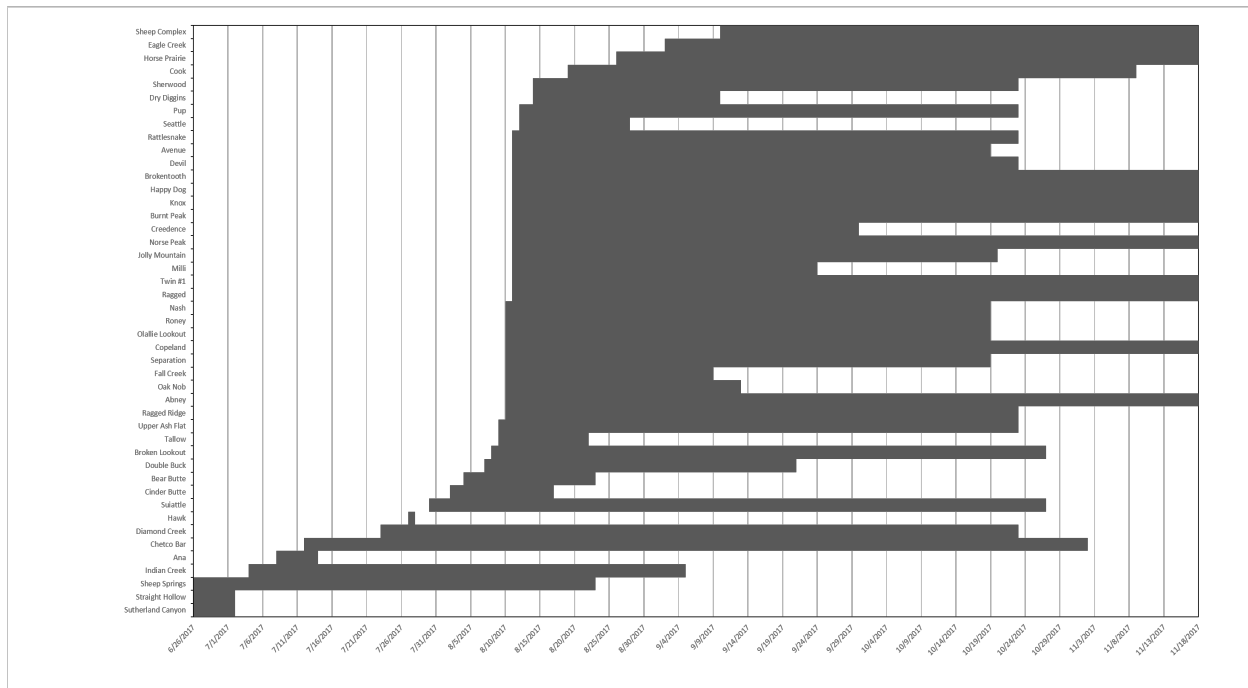
Incident management teams are categorized as Type 1 and Type 2. Type 1 IMTs usually handle the more strategically difficult fires, including "fire complexes," or multiple fires located in the same general area that become managed as one incident. Occasionally fires are large enough to require multiple incident management teams, such as on Chetco Bar. The number of Type 2 IMTs assigned to Northwest fires peaked at 10 teams on September 3 and 19 (Figure x). The number of Type 1 IMTs peaked at 7 between September 5 and 10. The largest number of IMTs, both Type 1 and 2, assigned at any one time was 17 on August 15th, with many of these teams managing complexes and multiple incidents.



Large forest fires tend to last a long time before they are contained or controlled as compared to rangeland fires. Most often, fires that start early (May and June) or late in the season (mid-September and later) are relatively short duration while those that start in the middle of fire season (July, August and early September) tend to last longer. In large part, these differences are due to the warmer and drier fuels and weather conditions, as well as the frequency of weather events that start and spread fires. Day length and sun angle can also play a role late in the fire season as the peak burning period becomes shorter and sheltered areas do not dry out as quickly after rainstorms. However, even a forest fire starting at the peak of fire season can appear to be short-duration if another fire overtakes it. When that happens, the smaller fire ends and is absorbed into the larger fire.

Figure X illustrates the duration of several selected large wildfires in 2017. Sutherland Canyon, Straight Hollow, Ana, Hawk, and Cinder Butte were all rangeland fires. Hawk depicts one extreme of large fire duration, lasting only three days. Pup Fire appears to be short duration, because Happy Dog Fire grew and absorbed it. In contrast, Indian Creek Fire was already a long-duration fire when it merged with Eagle Creek Fire. Some of the longest lasting fires were Abney, Ollalie Lookout, Milli, Twin #1, Norse Peak, Burnt Peak, Knox, Happy Dog, and Brokentooth.

2017 Selected Fire – Start to Containment



1

2 Large Fire Costs

3 Out of the 3,712 wildfires the Northwest experienced, 126 large fires resulted in
4 most of the costs. In 2017, the Northwest firefighting agencies collectively spent
5 over \$584 million dollars in direct suppression and emergency stabilization costs.
6 That cost does not account for the indirect costs to the agencies for bringing in
7 additional firefighting resources to fill in when the home unit resources were
8 already committed to wildfires. Nor does it account for the costs to local, state, and
9 county agencies, or for costs to businesses and homeowners, or health-related
10 expense caused by wildfires.

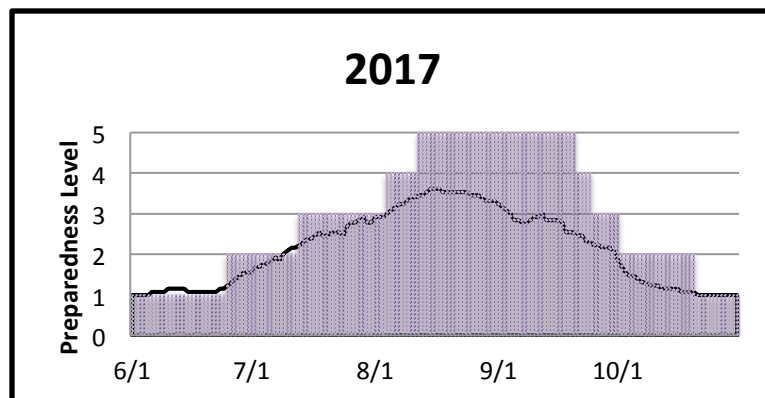
11 For example, the Cinder Butte Fire lasted roughly 10 days and cost an estimated
12 \$4,474,046 to suppress the fire and conduct emergency stabilization of the firelines
13 and repair other suppression-related damage. The Burns District estimated postfire
14 rehabilitation costs for the BLM-managed lands at \$4,986,000 for seeding, replacing
15 burned fences, protecting cultural resource sites, and monitoring. Harney County
16 Electric bore additional costs to replace burned power poles and lines and
17 homeowners had replacement costs for the four minor structures that burned.

18 Preparedness Levels

19 Preparedness levels indicate the severity of fuel and weather conditions, level of fire
20 activity, and the availability of firefighting resources (Table Y). The Northwest
21 Coordination Group (NWCG) sets the preparedness level for the Northwest while

the National Multi-Agency Coordination Group (NMAC) sets the national preparedness level each day throughout the year. As preparedness level increases, more federal and state employees become available to assist in firefighting efforts. In addition, resources from other parts of the country not experiencing wildfires are more likely to be ordered to regions where fires are actively burning. During the 2017 fire season, crews, IMTs, and other resources from the eastern United States and Alaska came to Oregon and Washington. At higher preparedness levels, the Department of Defense may make military resources available, such as helicopters, aircraft that can be fitted with temporary retardant tanks, and crews from the Army and National Guard.

On average, the Northwest slowly rises from PL1 to a peak at PL3 or PL4 (average is PL3.6) in mid-August, and then slowly falls back to PL1 by early October. Preparedness level in 2017 rose to PL2 in late June, about two weeks earlier than usual and reached PL3 by mid-July, about one month earlier than is typical (Figure X). The Northwest reached PL4 about the same time it normally reaches PL3 and only 8 days later moved to PL5 on August 12, remaining there a record 40 days, until September 21. After that, the Northwest began dropping preparedness levels relatively quickly, returning to PL1 by October 21. For comparison, in 2015, the Northwest moved to PL5 on August 13, but remained there for only 23 days before dropping back to PL4 on September 5 and to PL1 by October 9.



Nationally, the preparedness level reached PL4 on July 9 and PL5 on August 10. The national level remained at PL5 for 39 days, dropping back to PL4 on September 18 and PL1 on October 31. In addition to high activity in the Northwest, the Northern Rockies, Northern California, and the Great Basin had high fire activity with the great demand for firefighting resources.

Structures Lost

The Northwest does not have a reputation for losing structures in wildfires like California does, but in recent years that has begun to change. Fortunately, it remains rare to lose a large number of structures in a single incident. A total of 112 structures were lost in the Northwest, 61 in Oregon and 51 in Washington. Of these, 26 were single residences, 83 were minor structures (sheds, barns, etc.), and 3 were either mixed residential/commercial or nonresidential commercial structures. Twenty-nine of the 126 large fires burned structures. In Oregon, the greatest losses happened on Chetco Bar (6 residences, 24 minor structures); in Washington, the greatest losses happened on the Monument Hill Fire (3 residences, 20 minor structures).

Evacuations

Large fires in 2017 seemed to have resulted in an unusually high number of evacuations, although this statistic is not formally tracked. Based on daily incident reports (form ICS-209) 42 of the 126 large fires had some level of evacuation. Evacuation levels can be thought of as a variation Ready, Set, GO!

Level 1: Get Ready- *residents should be aware that danger exists in the area*

Level 2: Get Set- *residents must be prepared to leave at a moment's notice*

Level 3: Go – *residents should leave immediately*

Six large fires reached only Level 1 evacuation notices and six reached level 2. Thirty-six fires reached Level 3 evacuations and several fires had Level 2 evacuations in some areas and Level 3 in others. On seven of the fires that reached Level 3, the number of people evacuated was not recorded. On the remaining 29 fires, 8,858 people evacuated to friends or family, 512 sheltered in place, and 126 moved to temporary shelters. Chetco Bar Fire had the highest number of evacuations with 5,148 residents under Level 3. The next highest was Eagle Creek, with 1,822 people evacuated, including nearly the entire populations of Cascade Locks, Dodson, Warrendale, Bridal Veil, and Latourell.

Other Season Statistics

- Number of ESF4 activations –
- Number of Conflagration Act activations (Oregon) –
- Number of Fire Service Mobilization Plan activations (Washington) –
- National Guard mobilizations –
- Active duty military mobilizations –

MAC Group Adjustment of Priorities

During periods with high fire activity and a high demand for resources, the Pacific Northwest Region will put together a group that aides with the distribution and reallocation of resources to the fires with the highest need. The Northwest Multi-Agency Coordinating Group (NW MAC) works to provide adequate firefighting resources to meet current and anticipated needs, and decides where to allocate resources most effectively during periods of shortages. The MAC is responsible for:

- Prioritizing incidents
- Allocating or reallocating firefighting personnel and equipment
- Facilitating federal and state disaster response
- Keeping agency leaders and media informed
- Identifying and resolving issues across agencies

The group will be activated anytime the Pacific Northwest (PNW) goes into a Preparedness level of 4. When 10-14 large fires are burning within the PNW, most resources are assigned and committed to active fires and competition from other areas in the US limits the ability to attain more.

The 2017 Pacific Northwest Fire season saw a high need for resources due to the number and size of the existing fires that were occurring as well as substantial amount of initial attack. Fires outside of Oregon and Washington further stretched the amount and type of national and international resources the Northwest could obtain. Montana also had a record fire season with critical resource needs set as higher priority nationally than the Northwest during parts of August and September. British Columbia saw its worst fire season in history and used resources from the international partnerships the United States had used in the past, making that help unavailable to the Northwest. This made coordination between management teams, dispatch centers, fire managers and the NW MAC extremely important. This resource shortage would result in the rapid shifting of fire prioritization, it would affect the distribution of critical resources across the region, and in some cases, it would determine the length of time long-duration incidents would be able to utilize those resources.

Resource allocations at the NW MAC level are based off of many factors including the types of values at risk, and the urgency of the threat. The NW MAC also considers the immediate threat to people, homes, cities, businesses, critical infrastructure, private timberlands, socioeconomic reasons, or political factors. Size and fire behavior are not necessarily the driving factors of resource allocation. The Chetco Bar Fire was the priority fire in the nation from August 21 through September 1, after making a significant run towards the town of Brookings and prompting large evacuations in its path. Prior to that run, it was a lower priority due to its remote location, and the low level threat to people and property. In this instance, resources were reallocated from long-term indirect management strategy

1 fires to support this fire strategy that sought to immediately mitigate threats to
2 values at risk and achieve incident short-term objectives. The PNW would remain as
3 the region of national priority from August 13 until September 1. Priority fires
4 within the PNW changed several times as fires across the region progressed over
5 time and reacted to weather events. The Milli Fire on the Deschutes National Forest
6 became the priority fire in the PNW in anticipation of the august solar eclipse and
7 the drastic increase in the amounts visitors central Oregon. As the solar eclipse
8 event ended the prioritization of resources moved from Milli, back to Chetco bar.
9 Then on September 2, Eagle Creek Fire was ignited in the Columbia River Gorge
10 National Scenic Area. The fast moving fire burned over the trail, leaving 153 hikers
11 to shelter in place overnight. The fire would grow rapidly, closing off three major
12 transportation passageways including the complete halt of commercial river traffic
13 on the Columbia River, the railroad, Interstate 84 and Highway 30 in addition to a
14 total flight restriction over the fire. All of this was in addition to evacuations in
15 multiple communities. Eagle creek Fire would remain the highest priority fire in the
16 Northwest and nation for the remainder of September.

II. Preseason: Actions Taken from January through May

January through March

- Predictive Services issued forecasts and compared past forecasts with actual conditions for snowpack, temperature, and precipitation
- Each local Forest, BLM District, and State Unit conducted training and preseason meetings to prepare for the upcoming fire season.
- The National and Regional Training Centers offered a number of courses to train the fire community for various positions in Operations, Plans, Finance, Logistics, Fire Information, and Resource Advising
- Planning for the August eclipse began in January

April through May

- Predictive Services continued to issue forecasts and seasonal outlooks for the upcoming fire season. Based on April 1 snowpack and other indicators, it appeared that the upcoming season would be relatively mild.
- Planning continued for the August eclipse with monthly calls gradually becoming weekly calls
- Preparedness reviews occurred on all National Forest and BLM Units to assure that firefighters, equipment, and fire caches were ready.
- Hiring of new and returning seasonal firefighters began

III. 2017 Fire Season Key Elements

Introduction

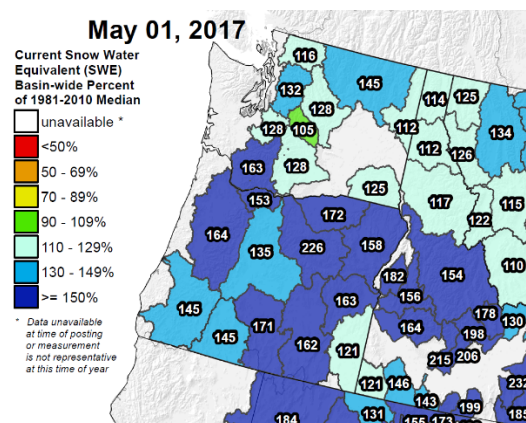
Several elements played roles in how the 2017 fire season progressed and the outcomes of the fires. Weather and climate are key elements in determining the length and severity of a fire season, although this season demonstrated that some factors that previously were very predictive of the type of fire season to expect are breaking down. Interagency cooperation and coordination are essential for managing wildfires and minimizing losses. As workforces continue to shrink, no single federal or state agency can handle this task alone even on many single fires, much less on multiple fires and across an entire fire season. Prevention and fire education programs reduce the probability of human-caused fires, but cannot eliminate them. Nonetheless, the prevention program was a key factor in the lack of human-caused fires during the total eclipse.

Weather and Climate

Pre-fire Season

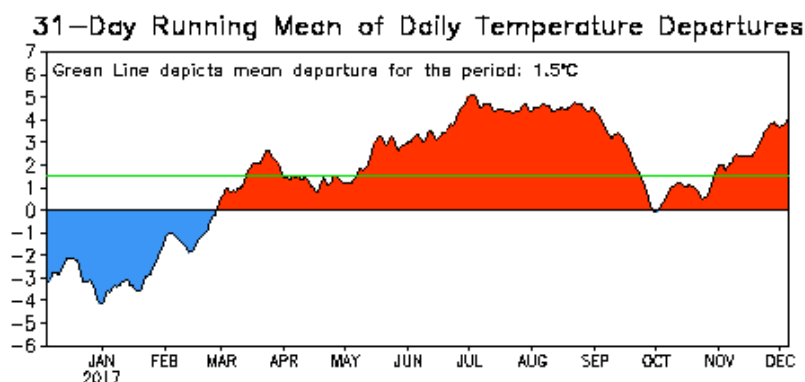
Winter and spring of 2016-2017 brought cold temperatures and continuous heavy accumulation of precipitation to the Pacific Northwest and the northern Rockies. As late as May, precipitation totals revealed that Oregon and Washington had received well above average rain or snow for the prior six months. Some climate zones were well above average accumulation and by April, regional reservoir storage was reported as reaching full capacity.

As of May 1st 2017, SNOTEL reporting sites were reporting greater than typical accumulation of snow. Timberline Lodge in Oregon had tabulated more than 520 inches total snowfall (Figure x). The cold, wet winter was attributed to La Niña conditions, which typically bring such conditions to the Pacific Northwest.



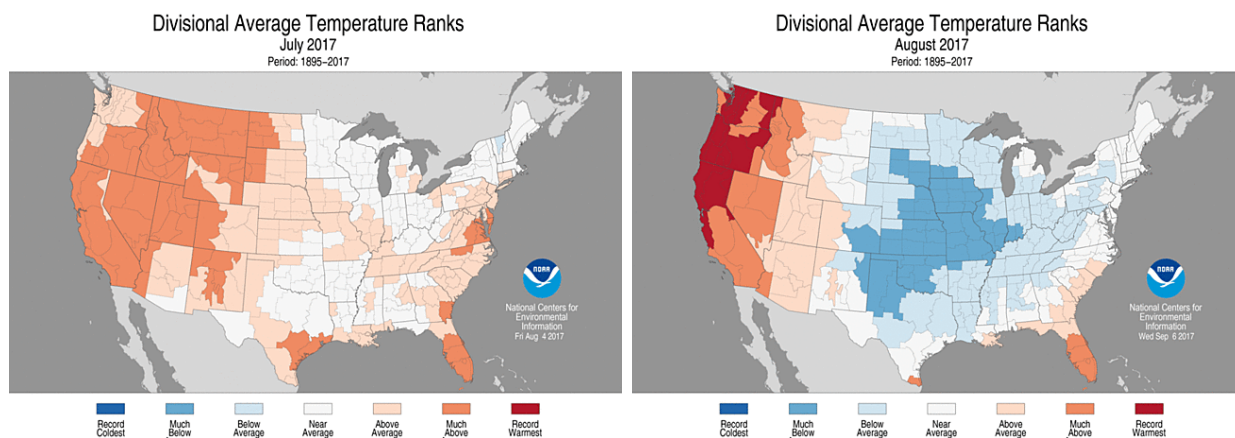
However, temperatures across the Northwest geographic area began warming above average in spring of 2017 even as precipitation continued across much of the area. Precipitation declined significantly after mid-June but temperatures continued to climb above average across the geographic area. For example, Yakima, WA

1 warmed to above average temperatures in March and remained above average until
 2 October, with well above average temperatures in June through mid-September
 3 (Figure x).

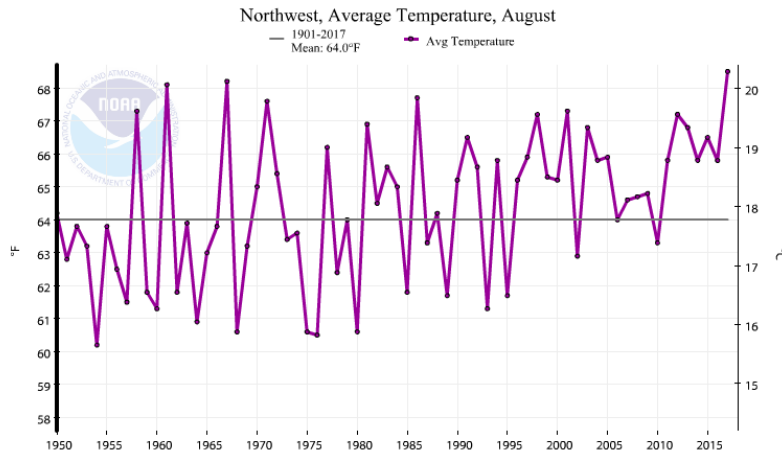


5 Fire Season Temperatures

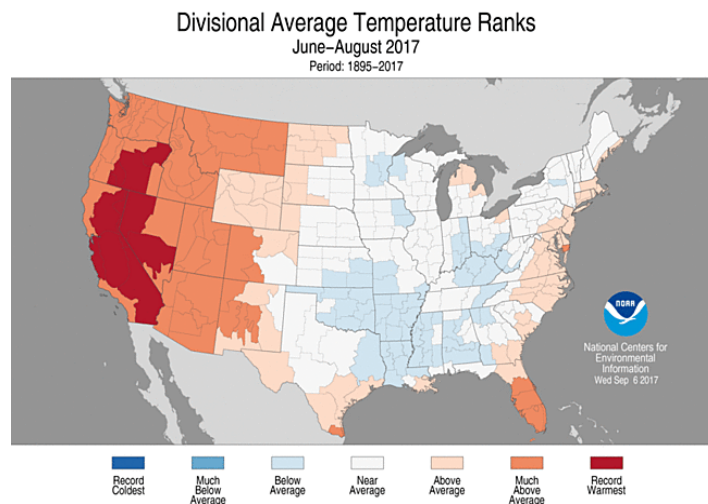
6 Temperatures continued to warm through July and peaked in August. July
 7 temperatures were well above average for much of the western US while August of
 8 2017 proved to be the warmest August on record for a number of climate zones in
 9 Oregon, Washington, and northern California (Figure x). Multiple records were set
 10 for consistent warm temperatures.



11 A look at a time series of August temperatures for Oregon, Washington, and Idaho
 12 stretching back to 1950 reveals that August of 2017 was the warmest ever
 13 recorded (Figure x). August temperatures for this region appear to be on an upward
 14 trend since about 1995. Only four Augusts since 1995 have had average or below
 15 average temperature.
 16



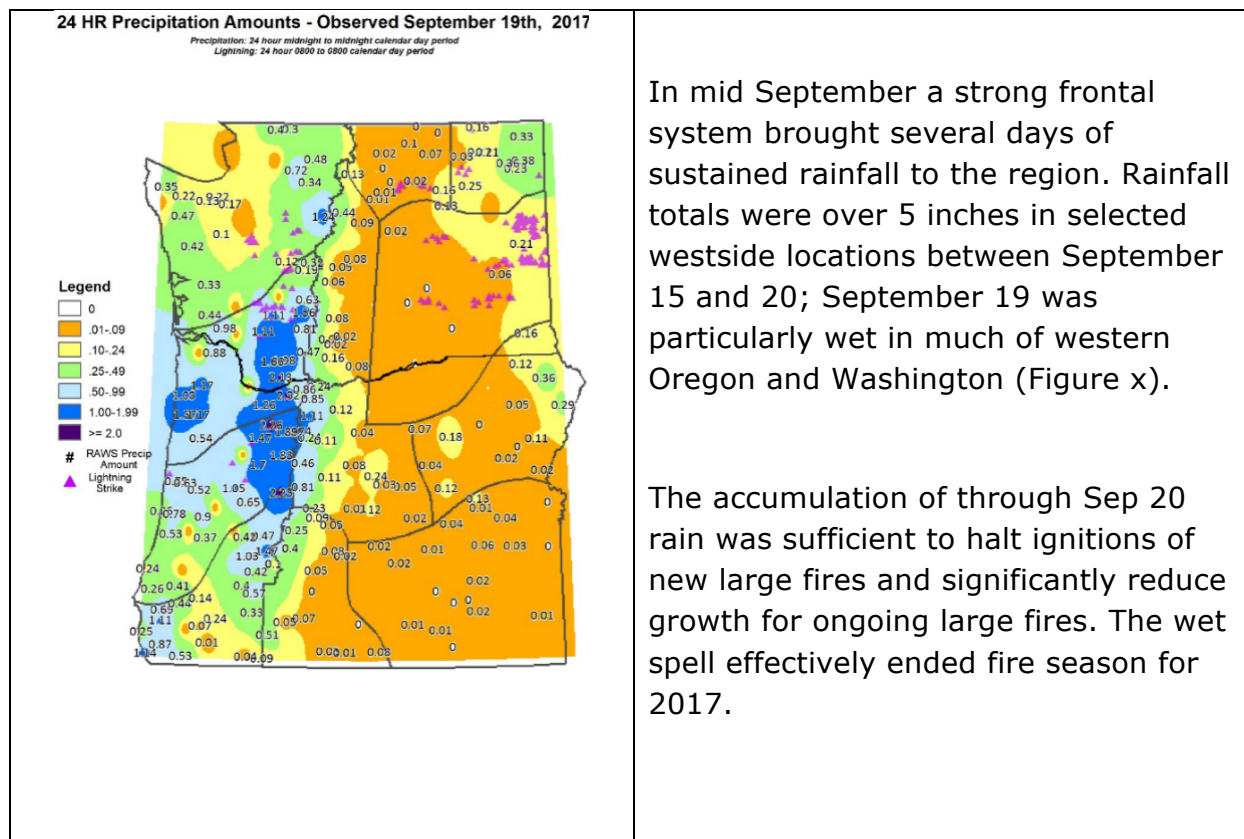
The three month period (June, July, and August of 2017) proved to be the warmest on record for the significant portion of the western United States (Figure x).



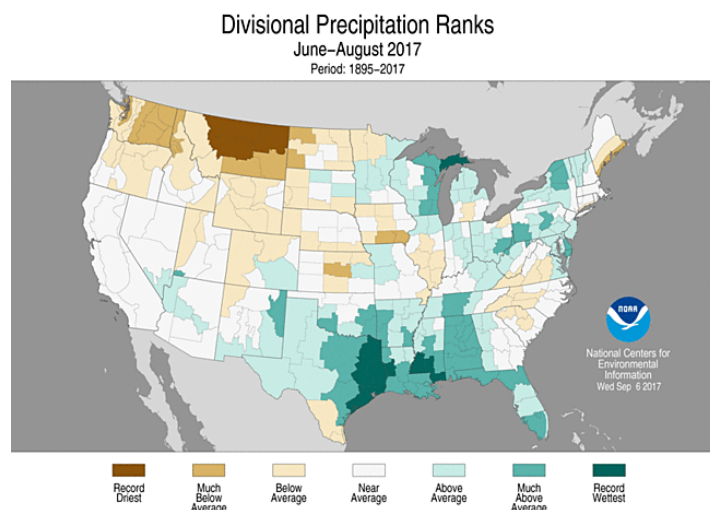
Temperatures fell back to normal or below in mid-September when a wet cold front brought a major weather change to the region. Cold, moist air lingered over the region bringing rainfall substantial enough to put a stop to new large fire outbreaks and halt the growth of existing large fires. Fire season was effectively ended by this event.

Fire Season Precipitation

Precipitation continued to accumulate over the Northwest geographic area in the spring of 2017, even as temperatures began rebounding back above normal. However, periodic frontal systems stopped arriving in mid-June and a lengthy dry spell followed. Cities such as Portland and Seattle went over 50 days before rain returned, briefly and sparsely, in early August. Another dry spell lasting more than month followed on its heels.

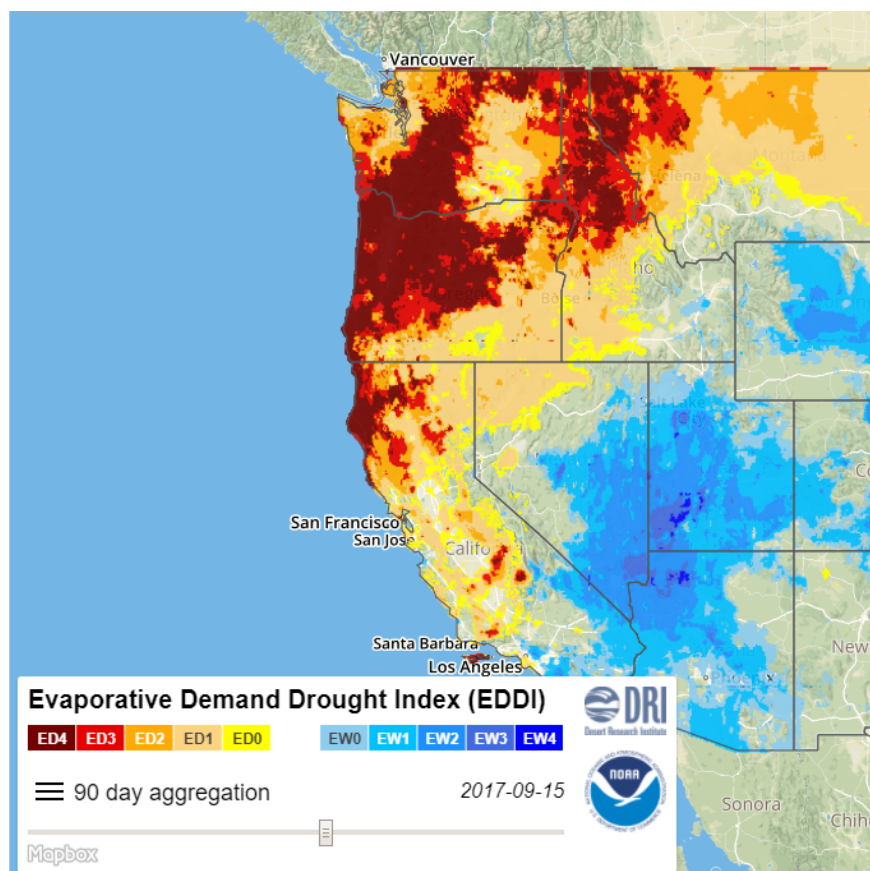


- 1
- 2 Overall, the three-month period June through August of 2017 was drier than typical
- 3 for most of the northwest geographic area but was not the driest on record (Figure
- 4 x). However, the high temperatures over the same period meant resulted in much
- 5 drier conditions than would otherwise be expected based on precipitation alone.



Flash Drought Development

The rapid change in temperature followed by the lack of precipitation in June created a flash drought potential. Flash droughts develop very quickly with little or no warning that a drought is developing. The wet winter and spring combined with the warm temperatures resulted in significant plant growth. However, as the precipitation dwindled and temperatures began to climb, the atmospheric demand for water resulted in very high evapo-transpiration rates, leading to rapid curing of grasses, rapid loss of moisture from dead woody fuels, and rapid development of drought stress in live fuels such as trees and shrubs. Over the three month period between when the rains shut off in mid-June and when they restarted in mid-September, the equivalent of extreme drought developed over the forests of the Northwest (Figure x).



Trends in Fire Danger

In contrast to fire season 2016, Energy Release Component show less variation during 2017. After precipitation ceased and temperature rose in mid-June fire danger began a steady upward climb. Regional ERC values were already a standard deviation or more above normal by early July and continued to climb. All-time

record (since 1990) values of regional ERC were achieved around August 1 and again in late August due to the continuing hot, dry weather. Only a brief decline was evident during a short spell of light rain in early August (Figure x).

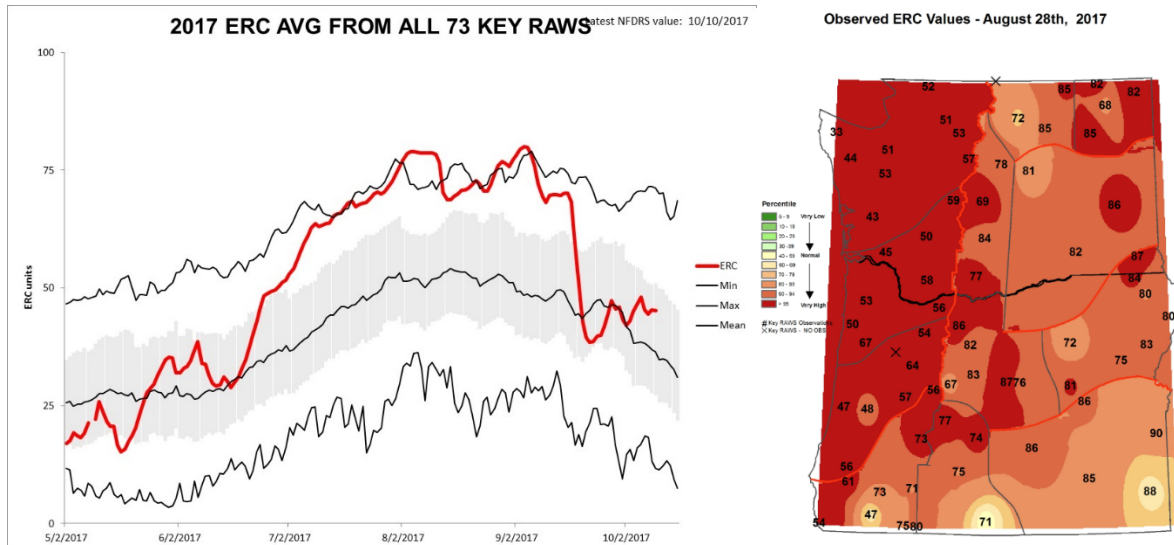


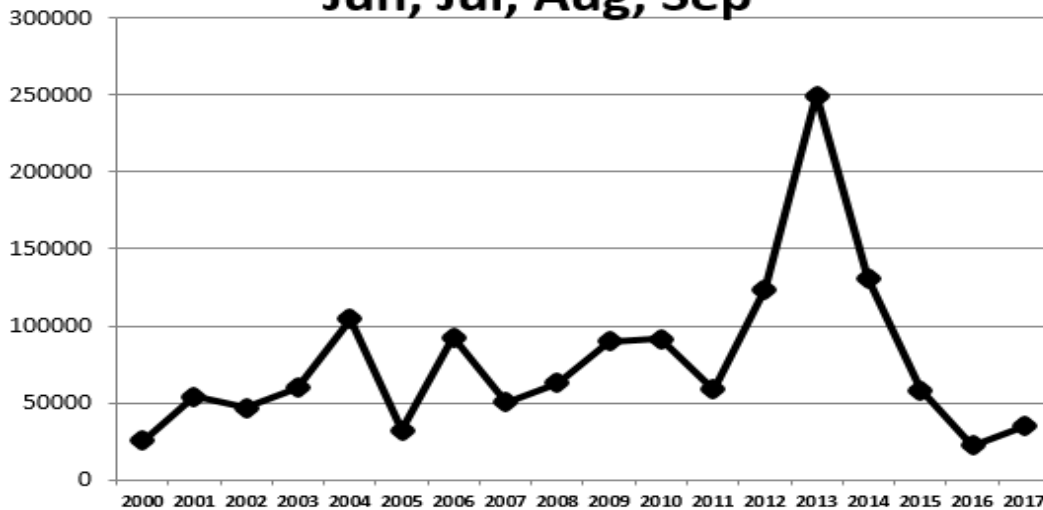
Fig X: Regional Trends in ERC 2017

Fig X: Peak ERC values late Aug

2017 Lightning Statistics

From June 1 through Sep 30 34,883 strikes were recorded over Oregon and Washington in 2017. This is the fourth lowest total for a fire season since the year 2000 (Figure x). The average for fire seasons 2000-2017 was 77,155 strikes.

Fire Season Lightning Strike Count Jun, Jul, Aug, Sep



1

2

3 Despite the below-average number of lightning strikes, fire activity was high due to
 4 the bulk of fire starts from strikes occurring at periods of hot, dry weather, in July
 5 and again in August. In addition, drought conditions helped to make both live and
 6 dead fuels highly susceptible to burning. The strikes were distributed more evenly
 7 spatially during fire season 2017 than in the 2016 season. Noteworthy fire starting
 8 events occurred at peaks of fire danger in July and the second week of August.

9 Wind Events (*added; needs vetting by John Saltenberger*)

10 Wind is always a significant factor in fire behavior and fire spread. Certain types of
 11 wind events are more problematic than others. Two of these that played a big role
 12 in the 2017 fire season were so-called foehn winds and winds associated with
 13 thermal troughs, sometimes referred to as heat lows.

14 A foehn wind, also known as a gravity wind, is a wind created by extreme pressure
 15 gradients between nearby surface high and low pressure systems and usually under
 16 an upper air high pressure system. The surface high and low set up a pressure
 17 gradient that results in wind flowing from the high towards the low while the upper
 18 air high pressure system pushes the winds towards the surface, hence the name
 19 "gravity wind". The east winds of western Oregon and Washington and the so-called
 20 Chetco Effect are examples of foehn winds. In east winds, high pressure in the
 21 Columbia Basin combines with low pressure offshore to essentially pull the warm,
 22 dry air from the eastside over to the westside. These winds are strongest at passes
 23 and down the Columbia River Gorge. In the Chetco effect, the high pressure is to
 24 the north and the low pressure to the south and the differing circulation patterns
 25 around each (clockwise around high pressure, counter-clockwise around low

1 pressure) combine to funnel winds down the Checto River and out to sea. In both
2 cases, as the air mass falls, it warms and dries, increasing fire danger and helping
3 fires to spread faster. The winds can also be very gusty and will shift with how the
4 terrain shifts. An east wind event resulted in the rapid spread to the west on Eagle
5 Creek Fire. The Chetco Effect was responsible for the rapid spread of the Chetco Bar
6 Fire towards Brookings.

7 Thermal troughs can be thought of as miniature cold fronts. They typically bring
8 very warm and very dry air with strong, gusty winds, causing fires to spread rapidly
9 to the north or northeast. Thermal troughs affected several fires in western Oregon
10 and the large fires in eastern Washington. Southwest Oregon in particular
11 experience several thermal trough passages, resulting in significant growth on fires
12 in the Miller, Umpqua North, and High Cascades complexes. A strong thermal
13 trough is what pushed the Diamond Creek Fire into Canada.

14

IV. Timeline The 2017 Fire Season Timeline

June

- Wet winter and spring had everyone anticipating a mild fire season based on past data
- Preparedness reviews within the path of totality for the Solar Eclipse often involved mock responses to potential incidents during the eclipse
- Malheur National Forest prepared to “host” the Rainbow Family gathering at the end of the month
- By mid-month, rain shut off and conditions began to turn hot and dry. Snowmelt in the mountains accelerated
- By the end of the month, large rangeland fires in cured grasses burned and the first significant lightning bust occurred on June 26
- Sutherland Canyon, Straight Hollow, and Spartan fires in Central Washington threatened both greater sage-grouse habitat and structures
- Sheep Springs Fire in the Deschutes National Forest started within the B&B Burn scar and handled using indirect attack tactics due to the number of snags.

July

- By July, fires happening all over the Northwest, including in locations not typically associated with July fires, such as the Noisy Creek Fire on the Colville National Forest.
- Indian Creek and Chetco fires both started in wilderness areas and initially handled as confinement fires due to inaccessibility, dangerous terrain, and, in the case of Chetco Bar abundant snags from previous fires.
- Rangeland fires such as Powerline, Bowden, and Hawk continued in eastern Oregon and eastern Washington.
- Indian Creek – July 4
- Powerline – July 8
- Lone Pine – July 9
- Chetco Bar – July 12
- Noisy Creek – July 15
- July 24-26 – second significant lightning bust
- Diamond Creek – July 23
- Whitewater – July 23

- Bowden – July 25
- High Cascades – July 25
- Hawk – July 27
- Suiattle – July 31

August

- Air quality deteriorated affecting human and firefighter health, making it difficult to locate new starts, and to support larger fires using aircraft.
 - National preparedness level moved to 5 on August 10 and the Northwest moved to preparedness level 5 on August 12.
 - Firefighting resource shortages intensifying due to demand in the Northern Rockies and Great Basin in addition to the Northwest. National Guard mobilizations began to support firefighting efforts.
 - The 2017 solar eclipse brought an estimated one million visitors to Oregon during August's hot, dry and unstable conditions. The visitors would be concentrated in the narrow 70-mile wide strip of the path of totality in rural towns and counties that lacked the infrastructure to support large scale emergencies, as well as the capacity to host the amount of expected visitors. Emergency services personnel expressed concerns about potential ignitions and fast moving fires in areas with many eclipse visitors. The logistical complexity to evacuate and account for the public, and transport fire responders quickly to fires during times with high traffic congestion added to these concerns.
- The Whitewater Fire near Mt. Jefferson closed miles of trails, including 30 miles of Pacific Crest Trail and hundreds of acres of forest and wilderness, potentially pushing more visitors to central and eastern Oregon each time the area and road closures increased. As the eclipse event drew near, fuel shortages were reported in central and eastern Oregon and traffic was backed up for 50 miles in parts of central Oregon. However, the fire prevention and education efforts were a success. No worst-case scenarios played out and human impacts were less than expected. No known human caused ignitions evolved into any fires of significance.
- Cinder Butte – August 2
 - Bear Butte – August 4
 - Falcon Complex – August 8
 - Nena Springs – August 8
 - The week of August 9 saw several thunderstorms that started a large number of fires across the Northwest.

- 1 • Jones – August 10
- 2 • North Pelican – August 10
- 3 • Staley/Tumblebug 2 – August 10
- 4 • Umpqua North Complex – August 11
- 5 • Jolly Mountain – August 11
- 6 • Milli – August 11
- 7 • On August 13 international firefighting resources were sent from Australia,
- 8 New Zealand, and Mexico to support firefighting efforts in British Columbia,
- 9 making these resources unavailable to support fires in the United States.
- 10 • Miller Complex - August 14
- 11 • On August 18-21, Chetco Bar made a big run to the west towards Gold Beach
- 12 and Brookings under strong east-northeast winds, resulting in evacuations
- 13 and the loss of structures.
- 14 • Horse Creek Complex – August 21
- 15 • Horse Prairie - August 26
- 16 • Potato Hill – August 29
- 17 • Uno Peak – August 30
- 18 • August 17 – Hurricane Harvey hits Texas. August 30 - Hurricane Irma hits
- 19 Puerto, US Virgin Islands ,Florida. Hurricanes Harvey and Irma placed
- 20 pressure on incident management team and contract crew availability in
- 21 order to support hurricane relief efforts.

22 September

- 23 • Burning conditions in early September were a continuation of those in
- 24 August. Significant spread events occurred on new starts, such as Eagle
- 25 Creek in the Columbia River Gorge National Scenic Area.
- 26 • Eagle Creek – September 2
- 27 • East Crater – September 3
- 28 • Rim – September 3
- 29 • On September 4, Diamond Creek spread across 45,000 acres, burning well
- 30 into British Columbia and Norse Peak made a 25,000 acre run under the
- 31 influence of a thermal trough.
- 32 • On September 5 under strong east winds, Eagle Creek ran 13 miles to west
- 33 towards Troutdale, Oregon and spotted across the Columbia River, starting
- 34 what became the Archer Mountain Fire in Washington.

- The last lightning episode of significance occurred in the September 9-11 period but more of these storms had some moisture with them, resulting in fewer fire starts.
- Desolation – September 9
- On September 9, crews from the U.S. Army joined the firefighting effort due to shortages of firefighting resources.
- Nash – September 10
- Crab Creek – September 15
- More general rains finally returned in mid-September, slowing or halting fire spread and allowing firefighters to start getting ahead of the large fires.

October

- Most of October was spent conducting suppression repair work on the larger fires and areas with greater impacts from fires. Considerable effort was spent felling hazard trees along highways and major travel routes, removing fire-related debris from near culverts, improving drainage on firelines, and assessing the level of additional restoration work needed.

V. 2017 Post-Fire Response and Recovery

Fire Suppression Repair

Fire suppression repair is the first phase in recovery efforts that seek to repair damages resulting from fire suppression activities and to restore the area as close as possible to a “pre-event” state. Crews work to repair the hand and mechanical fire lines, roads, trails, staging areas, safety zones, and drop points constructed as part of the fire suppression efforts.

Emergency Assessment and Mitigations: Burned Area Emergency Response

The second phase of post-fire response and recovery is an assessment of natural and cultural resource damage and identification of rehabilitation and restoration needs. Both the Forest Service and BLM can conduct this assessment using Burned Area Emergency Response (BAER) teams. The Forest Service maintains a cadre of BAER team members at the local or regional level and typically uses a BAER team on every large fire. The Department of the Interior maintains an interagency cadre of BAER team members consisting of personnel from BLM, the National Park Service, Fish and Wildlife Service, and Bureau of Indian Affairs. Typically, DOI BAER teams are called out only on very large fires or when District staff are overwhelmed by the number of fires. Otherwise, BLM Districts use a local cadre of personnel with the same skills as a BAER team, but refer to this phase as emergency stabilization.

BLM’s emergency stabilization and rehabilitation program funds emergency needs and up to three years of rehabilitation work in the post-fire environment. Typical activities in rangelands include installing temporary fences, replacing fences, planting sagebrush and other shrubs, seeding grasses and forbs, controlling invasive plants, closing areas to livestock grazing during the recovery period, and monitoring. In forests, program activities typically include tree planting, hazard tree removal, invasive plant control, and repairing or installing water diversion structures on roads and trails.

BAER teams assemble very soon after a fire is contained, or even before a fire is contained on very long duration fires, to conduct a rapid assessment of burned watersheds. This team of specialists and experts evaluate and identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources. They identify emergency stabilization measures to take before the first major storms of the season arrive. High intensity fires can result in loss of vegetation, increased exposure of soil to erosion, and increased water runoff that may lead to flooding, increased sediment accumulation in rivers and streams, debris flows, spread of invasive plants, and damage to critical natural and cultural resources.

1 Teams develop a Soil Burn Severity (SBS) map to document the degree to which
2 soil properties had changed within the burned area. Fire damaged soils have low
3 strength, high root mortality, and water repellent properties that increase water
4 runoff and erosion. Using the SBS map, BAER team members run models to
5 estimate changes in stream flows and debris flow potential in forests. Similar
6 models are not available for rangelands so BLM teams use bare ground extent to
7 assess water and wind erosion risks. In general, the higher the soil burn severity,
8 the larger the watershed response and the higher the risk of erosion and flooding.
9 The findings provide the information needed to prepare and protect against serious
10 post-fire threats. Emergency stabilization measures may include mulching,
11 installation of erosion and water run-off control structures, temporary barriers to
12 protect recovering areas, and installation of warning signs. BLM also includes
13 herbicide treatments, seedings, culvert replacement, storm patrol, cultural resource
14 stabilization, and monitoring as part of emergency stabilization. BAER work may
15 replace fire-damaged facilities critical to public safety, such as stream crossings;
16 remove safety hazards; prevent permanent loss of habitat for threatened and
17 endangered species; and prevent the spread of invasive plants, and protect critical
18 cultural resources.

19 Eastern Oregon and Washington

20 ***Burns District***

21 The Cinder Butte, Coyote, and Upper Mine fires on Burns District have emergency
22 stabilization and rehabilitation plans. Collectively, these fires affected 56,885 acres
23 of BLM-managed lands. In addition to the typical activities, Cinder Butte and Upper
24 Mine had cultural resource protection needs and Upper Mine requested funds for
25 soil stabilization and water diversion structures. The post-fire work is intended to
26 restore habitat for greater sage-grouse, pygmy rabbit, pronghorn, big game, and
27 wild horses and burros. Major land allocations affected include sage-grouse general
28 habitat management areas, priority habitat management areas (12
29 Mile/Paulina/Misery Flat Priority Area for Conservation (PAC)), wilderness study
30 areas, and research natural areas.

31 ***Lakeview District***

32 Lakeview District prepared stabilization and rehabilitation plans for the Ana, Cogan
33 Mac's Draw, McCarty, and Wildcat fires covering a total of 5,897 acres. The Ana Fire
34 affected 3,977 acres of BLM-managed lands in the Picture Rocks PAC while the
35 other fires affected sage-grouse general habitat management areas, a wilderness
36 study area, and habitat for pronghorn and mule deer. Concerns were especially
37 high for the Ana Fire since the Picture Rocks PAC had tripped a soft trigger for
38 sage-grouse populations based on 2016 data and was expected to trip a hard
39 trigger based on 2017 data and for the Mac's Draw Fire which affected an area that
40 burned in 2001 and was rehabilitated then.

1 **Prineville District**

2 Prineville District developed plans for the Hampton and Horn Butte fires, which
3 collectively burned 4,020 acres. Hampton Fire affected a portion of the 12
4 Mile/Paulina/Misery Flat PAC, sage-grouse general habitat management area, and a
5 wilderness study area. Horn Butte Fire burned a designated area of critical
6 environmental concern for long-billed curlew nesting habitat.

7 **Spokane District**

8 Spartan and Sutherland Canyon fires, which burned at the same time, needed plans
9 from Spokane District. Both fires affected habitat for greater sage-grouse, with
10 Sutherland Canyon Fire affecting the Moses Coulee PAC. Sutherland Canyon also
11 burned within the recovery emphasis area for the endangered Columbia Basin
12 pygmy rabbit, prompting efforts to retrieve several rabbits from the burned over
13 landscape. Both fires also affected habitat for BLM special status species, including
14 an area of critical environmental concern established for Whited's milkvetch.
15 Sutherland Canyon also burned 1,709 acres that had burned one or more times in
16 recent years.

17 **Vale District**

18 Vale District prepared plans for the Bowden, Hawk, Horse Cross, Little, and Morgan
19 Creek Fires, covering 27,692 acres. Hawk Fire burned entirely within the Cow Lakes
20 PAC, which has tripped a hard trigger for the combination of sage-grouse habitat
21 and population. Horse Cross Fire affected the Folly Farm/Saddle Butte PAC and
22 Little Fire burned in the Louse Canyon PAC, which is also a designated sagebrush
23 focal area. Bowden Fire burned within the perimeter of the 2012 Long Draw Fire in
24 a wilderness study area that was not rehabilitated at that time. Other resources
25 affected by these fires included BLM special status plant species, bighorn sheep
26 habitat, sage-grouse general habitat management areas, big game winter range,
27 pygmy rabbit and golden eagle habitat, and around lava tubes used by western big-
28 eared bat.

29 **Western Oregon**

30 **Coos Bay District**

31 Chetco Bar Fire burned approximately 6,500 acres on lands managed by the Coos
32 Bay District, although the plan was prepared before the fire was fully contained.
33 Resource concerns within the burned area include infestation of noxious weeds and
34 loss of habitat for federally threatened northern spotted owl, marbled murrelet, and
35 Coho salmon. Pacific fisher, a species of concern, has also been documented in the
36 area. Proposed treatments include warning signs, road drainage improvement,
37 hazard tree removal, invasive plant control, and planting trees.

38 **Roseburg District**

39 Horse Prairie Fire burned an estimated 7,630 acres of lands managed by Roseburg
40 District. Soil Burn Severity (SBS) acres for identified 669 acres of high severity,

2070 acres of moderate, 1817 acres of low, and 3074 acres of very low or unburned. Resource concerns within the burned area include spread of invasive plants and loss of habitat for federally threatened northern spotted owl, marbled murrelet, and Coho salmon. Proposed treatments include warning signs, road drainage improvement, hazard tree removal, archaeological site protection, invasive plant control, and planting trees.

Rapid Assessment and Long-Term Recovery

The third phase is the long-term recovery, or restoration, work. Restoration work consists of non-emergency actions to improve fire-damaged lands that are unlikely to recover naturally and to repair or replace facilities damaged by the fire that are not critical to life and safety. This phase may include restoring burned habitat, reforestation, other planting or seeding, monitoring fire effects, replacing burned fences, interpreting cultural sites exposed or damaged by the fire, treating invasive plants, and installing interpretive signs. Region 6 of the Forest Service uses a Rapid Assessment team process to evaluate these long-term recovery needs. BLM uses the same team that identifies emergency stabilization needs, however, this portion of the program is called Burned Area Rehabilitation.

Eagle Creek Fire

A BAER team consisting of scientists and experts in soils, geology, hydrology, engineering, botany, recreation, archaeology, and fisheries, along with GIS support and public information officers responded to Eagle Creek Fire. The team conducted a rapid assessment emergency stabilization needs starting September 25. Treatments recommended and approved for immediate implementation within the fire include rockfall protections at Multnomah Lodge, removing fallen rocks and trees on Highway 30 and accesses to State Parks, removing hazard trees along road edges and near facilities, emergency closure and hazard warning signs, and invasive plant treatments.

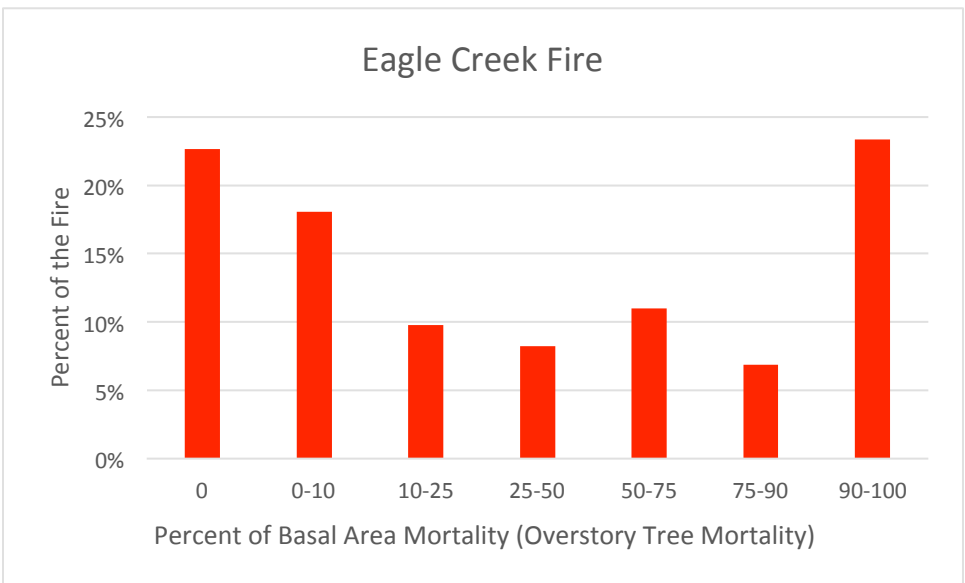
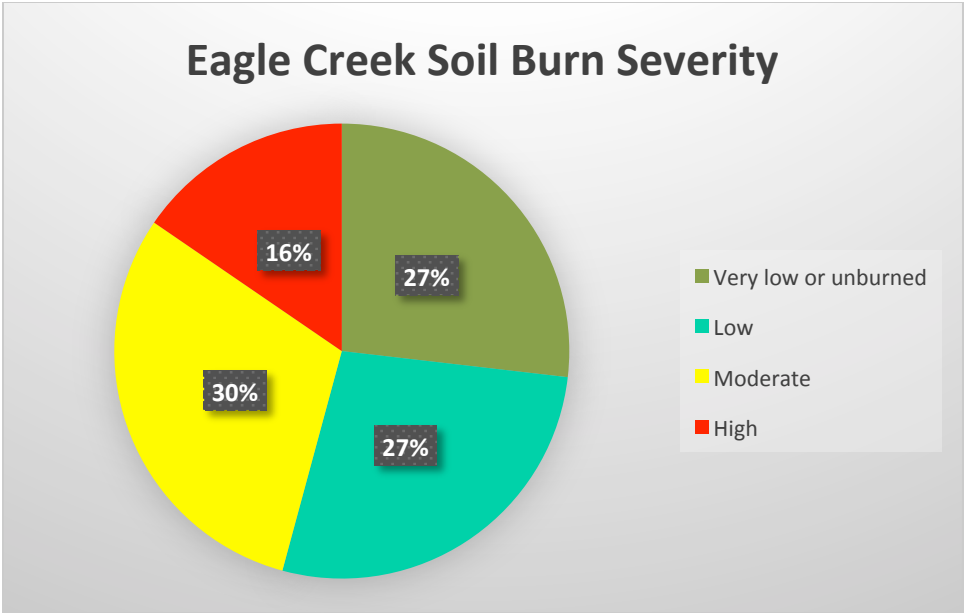


Figure XX. Percent of basal area mortality for the Eagle Creek Fire across all ownerships.

There was no Rapid Assessment Team assigned for the Eagle Creek fire due to the land use allocations that the fire burned in (administratively withdrawn lands and wilderness) that do not permit timber salvage.

The Forest Service hosted Eagle Creek Fire Response partnership meetings in Cascade Locks on October 4 and November 1. Local organizations and partner agencies discussed the status of the Eagle Creek Fire and began an open conversation regarding the recovery efforts to come. At the first meeting attendees brainstormed ideas and major topics grouping these into six over-arching themes to be discussed in small groups at the next meeting. The six themes included trail

maintenance and repair, ecological restoration and citizen science, environmental education, creative and emerging volunteer roles, coordination and communication, and funding. Eventually the creative and emerging volunteer discussion was integrated into each of the other topic areas, and ecological restoration and citizen science group narrowed their focus to invasive species. Small groups of engaged volunteers and partners continue to meet and develop collaborative action plans addressing each of these themes. The larger group of Eagle Creek Fire Response partners will reconvene in late January to report progress and solicit feedback on the individual action plans.

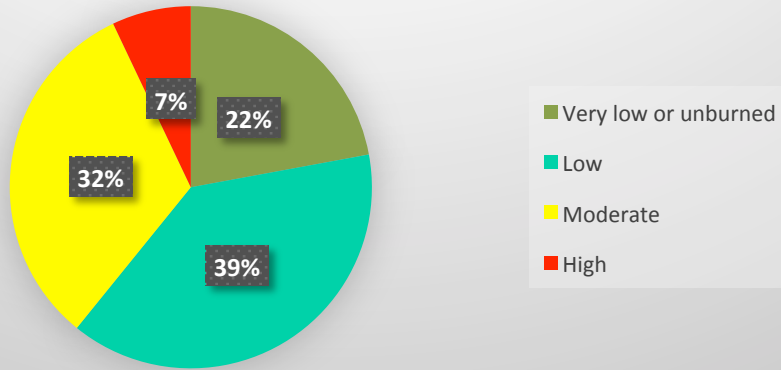
Table XX. Unfunded post fire restoration and infrastructure needs for the Eagle Creek fire.

Activity	Unfunded Need
Non-BAER Multnomah Falls Contingency (Hazard Trees)	\$50,000
Non-BAER Multnomah Falls Rock Catchment Fence Reinforcement	\$280,000
Trail Rebuilding and Trail Bridge Replacement	\$8,000,000
Project Management / Leveraging Support	\$120,000
Additional Trail Crew & Volunteer Coordination -- Increased Trail log out & routine maintenance	\$215,000
Eagle Creek Water System	\$100,000
Engineering Support -- Design, Contract Prep, Contract Oversight	\$300,000
Multnomah Falls Contingency (Hazard Trees)	\$50,000
Co-visioning -- Connective Partnerships	\$50,000
Public Affairs Assistance	\$45,000
NEPA/Consultation/Consistency Review	\$180,000
Field Rangers	\$52,000
Lidar Acquisition	\$5,000
Eagle Creek Fire Total Funding Needs	\$9,447,000

Chetco Bar and the Fires on the Rogue River-Siskiyou National Forest

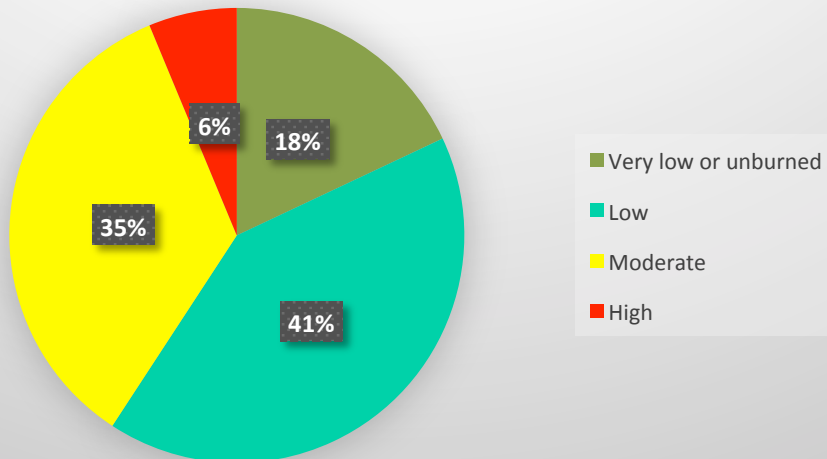
Rogue-River-Siskiyou National Forest assembled four BAER teams over the course of the 2017 fire season. The BAER team for the Chetco Bar fire assembled in late September for two weeks to complete that assessment. Overall the soil burn severity for all fires on the forest were found to be much lower than originally anticipated but especially so for Chetco Bar with less than 6% found in high severity. Treatments authorized for the Rogue River-Siskiyou BAER include over 100 miles of road work, several miles of trail stabilization, limited hazard tree treatments, hazard signage, invasive plant treatments and cultural resource protections.

Rogue River-Siskiyou Fires Soil Burn Severity



1

Chetco Bar Soil Burn Severity



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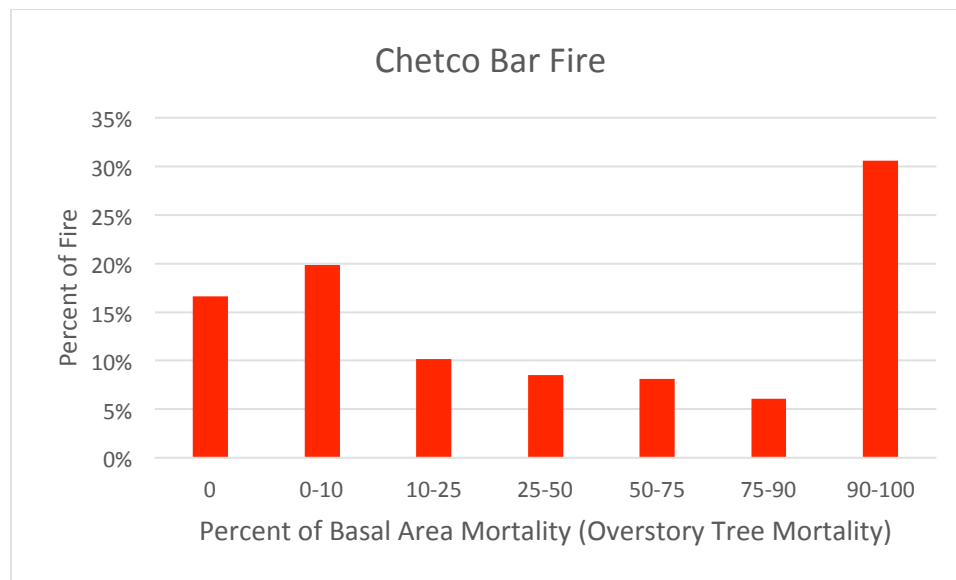


Figure XX. Percent of basal area mortality for the Chetco Bar fire across all ownerships.

Chetco Bar Fire on the Rogue River-Siskiyou burned across approximately 170,000 acres of National Forest System lands, with 48 percent of the fire occurring in wilderness, 33 percent in Late Successional Reserve and 17 percent in the matrix land use allocation. There were some larger patches of high severity crown fire runs, with 45 percent of the burned area experiencing >50 percent overstory tree mortality (Figure XX). Forest managers are working to reopen around 300 miles of roads impacted by the fire by felling roadside danger trees and about 100 miles of additional roadside danger tree removal within the perimeters of High Cascades and Miller complexes. Forest managers are also considering options for commercial timber salvage within the matrix lands of the Chetco Bar Fire along the private land boundaries in order to reduce fuel loadings along those boundaries, to assist in future fire management options, and to recoup some economic value from the burned trees. Finally, they identified approximately \$7 million in currently unfunded post fire recovery needs to stabilize the road system, restore infrastructure damaged by the fires and mitigate impacts from the fire in some key habitats (Table XX). The Forest Service is pursuing options for funding some of these post-fire restoration needs as the Rogue River-Siskiyou National Forest does not have the funding to implement these activities at this time.

Table XX. List of currently unfunded post-fire recovery needs for the Rogue River-Siskiyou National Forest. This list is for all of the 2017 fires that occurred on the Rogue River-Siskiyou, not just the Chetco Bar fire.

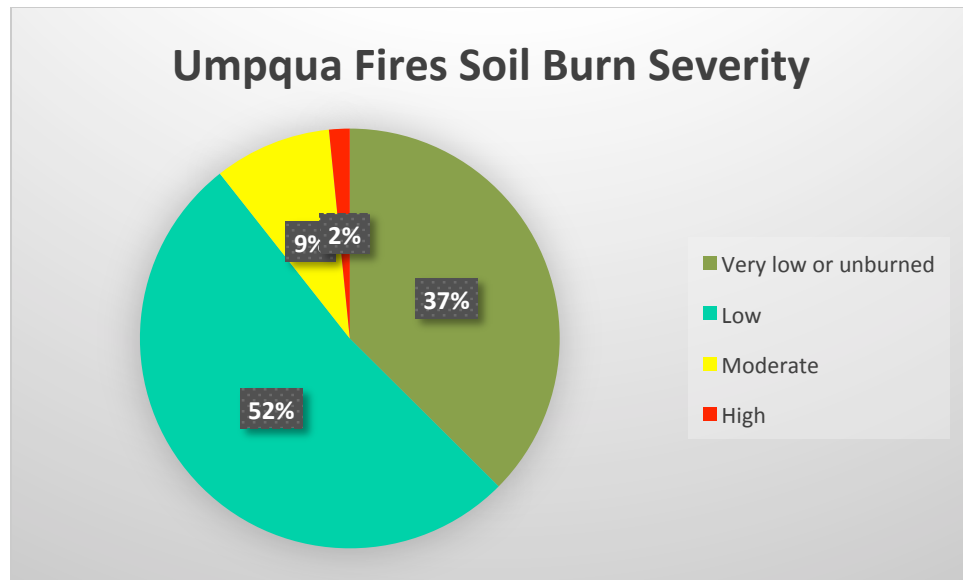
Activity	Estimated Damage/ Needs	Units	Unit Cost	Cost
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Road prism repair	360	miles	\$5,000	\$1,800,000
Road structures (bridges or culverts)	30	structures	\$25,000	\$750,000
Trails	117	miles	\$4,000	\$468,000
Trail Structures	3	structures	\$15,000	\$45,000
Trail Signage	2	each	\$5,000	\$10,000
Hazard tree removal (roads, trails or other areas)	477	miles	\$2,000	\$954,000
Wildlife Guzzlers	5	structures	\$3,000	\$15,000
Fish Habitat Structures	5	each	\$45,000	\$225,000
Developed Rec Sites	10	sites	\$5,000	\$50,000
Administrative sites- Blue Ledge Mine CERCLA site	1	sites	\$20,000	\$20,000
Cultural site protection	12	sites	\$7,000	\$84,000
NEPA capacity	1	each	\$100,000	\$100,000
Revegetation Needs	20000	acres	\$125	\$2,500,000
Range Improvement Repair	24	structures		51300
Fence Replacement	1	miles	\$30,000	\$30,000
Assess, monitor range condition post fire	50	days	\$500	\$25,000
Rogue River-Siskiyou Total Funding Needs				\$7,127,300

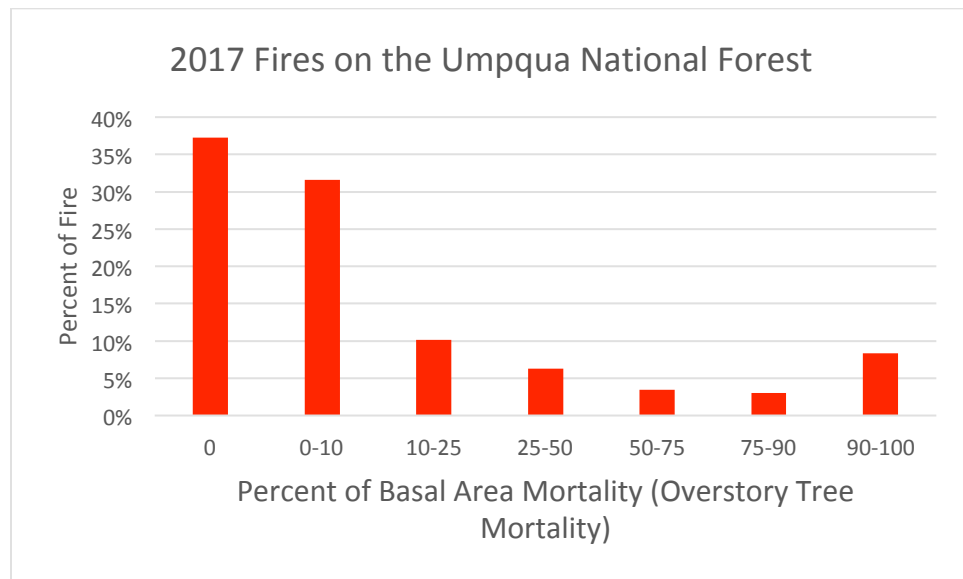
1

2 ***Umpqua National Forest***

3 Umpqua National Forest also convened multiple BAER teams over the course of the
4 fire season to address the post-fire emergency needs. The majority of fires on the
5 Umpqua showed high percentages (89 percent) of low to very low soil burn
6 severities and therefore had a lesser need to post-fire emergency funding. BAER
7 treatments approved for the Umpqua include road and trail drainage upgrades,
8 emergency hazard signage, cultural resource protections and invasive plant
9 treatments.



1



2

3 Figure XX. Percent of basal area mortality for all of the 2017 fires on the Umpqua
4 National Forest.

5 Umpqua National Forest experienced fires scattered across three Ranger Districts
6 totaling approximately 65,000 acres. These fires mostly burned at very low
7 severities, with about 79 percent of the burned acres experiencing less than 25
8 percent overstory mortality (Figure XX). The Forest is working to reopen around
9 300 miles of roads impacted by the fires by felling roadside danger trees within the
10 fire perimeters. Staff on the Umpqua are also considering options for commercial
11 timber salvage on two fires that burned within matrix land allocations on the Tiller
12 Ranger District. These salvage units are expected to be less than 250 acres each.
13 Finally, the Umpqua has identified approximately \$4 million in currently unfunded
14 post fire recovery needs to stabilize the road system, restore infrastructure

damaged by the fires and mitigate impacts from the fires in some key habitats (Table XX). The Forest Service is pursuing options for funding some of these post fire restoration needs as the Umpqua does not have the funding needed at this time.

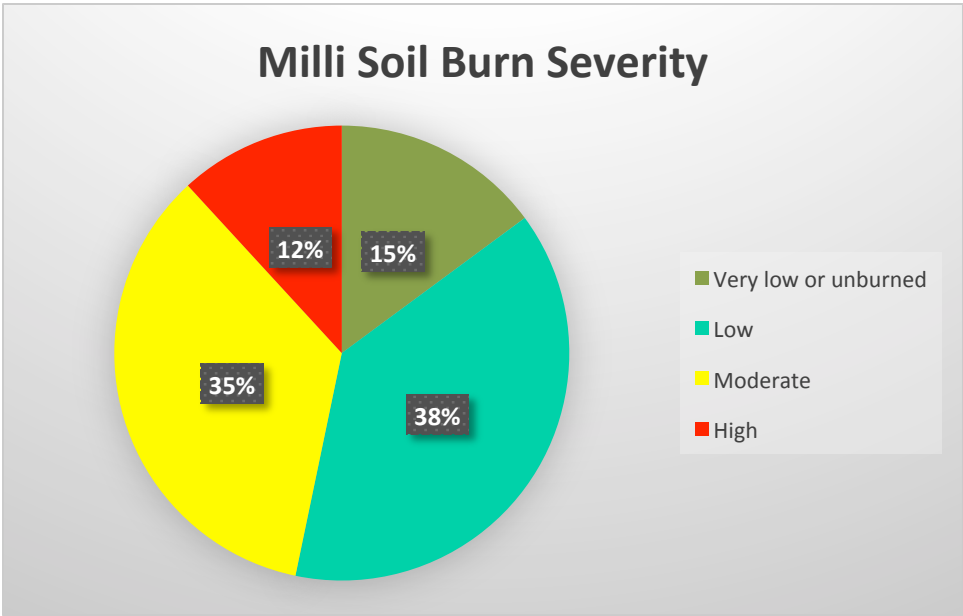
Table XX. List of currently unfunded post fire recovery needs for the Umpqua National Forest. This list is for all of the 2017 fires that occurred on Umpqua National Forest.

Activity	Estimated Damage/ Needs	Units	Unit Cost	Cost
Road prism	184	miles	\$5,000	\$920,000
Road structures (bridges or culverts)	10	structures	\$25,000	\$250,000
Developed Rec Sites	5	sites	\$5,000	\$25,000
Trail Bridges	6	structures	\$90,000	\$540,000
North Umpqua Trail Reconstruction	11	miles	\$22,000	\$242,000
Trail Reconstruction	23	miles	\$1,500	\$34,500
Horseshoe Bend Water System	1	each	\$20,000	\$20,000
Hazard tree removal (roads, trails or other areas)	229	miles	\$2,000	\$458,000
Developed Rec Sites	5	sites	\$5,000	\$25,000
Administrative sites	2	sites	\$5,000	\$10,000
Cultural site protection	7	sites	\$7,000	\$49,000
Huckleberry SIA restoration	100	acres	\$150	\$15,000
NEPA capacity	1	each	\$50,000	\$50,000
Invasive Species	640	acres	\$70	\$44,800
Revegetation Needs	5000	acres	\$275	\$1,375,000
Signs	28	Road Number	\$25	\$700
Signs	9	Site Identifier	\$50	\$450
Signs	8	Directionals	\$150	\$1,200
Umpqua Total Post Fire Funding Needs				\$4,060,650

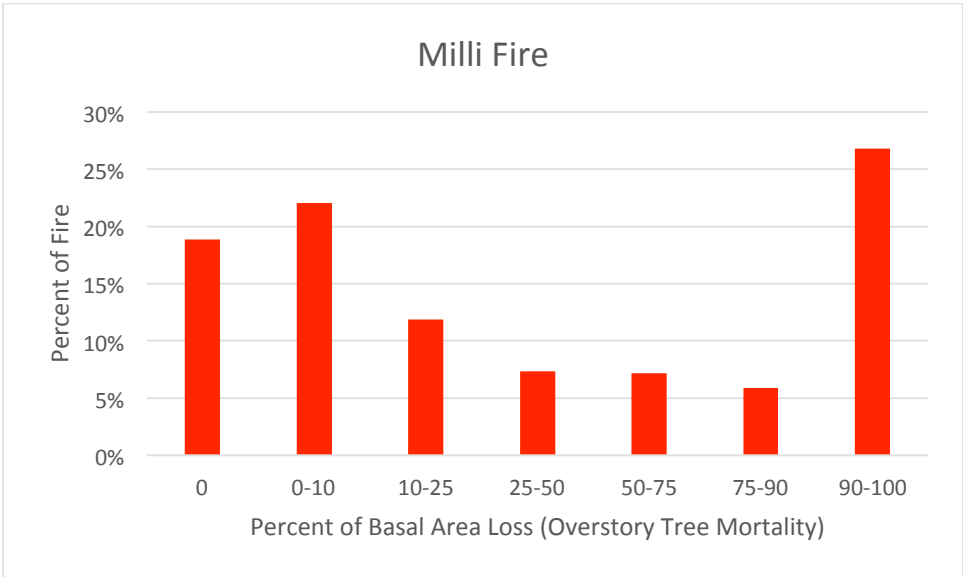
Milli Fire

The BAER team for Milli Fire completed its assessment in mid-September. Milli Fire had one of the highest soil burn severities of the Oregon fires with 47 percent of the

1 area in moderate and high. BAER treatments in the Milli Fire included road and trail
2 treatments, hazard signs, cultural site protections, and invasive plant treatments.



3



4

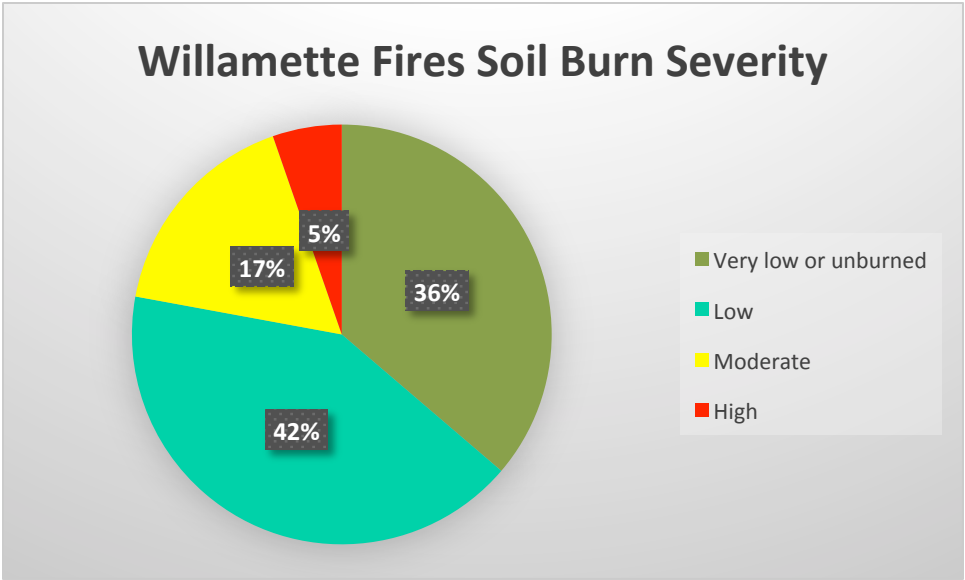
5 **Figure XX.** Percent of basal area mortality for the Milli fire on the Deschutes
6 National Forest.

7 Milli Fire on the Deschutes National Forest burned across approximately 24,000
8 acres of NFS lands, primarily in wilderness (39 percent) and late successional
9 reserves (39 percent) with about 12 percent of the fire occurring in the matrix land
10 allocation. Due to two days of rapid fire growth about 39 percent of the fire acres
11 had greater than 50% overstory mortality (Figure XX). The Deschutes has focused
12 on treating roadside danger trees to reopen roads to all safe public access. They are
13 not pursuing area salvage at this time. Unlike other Forests in the region, the

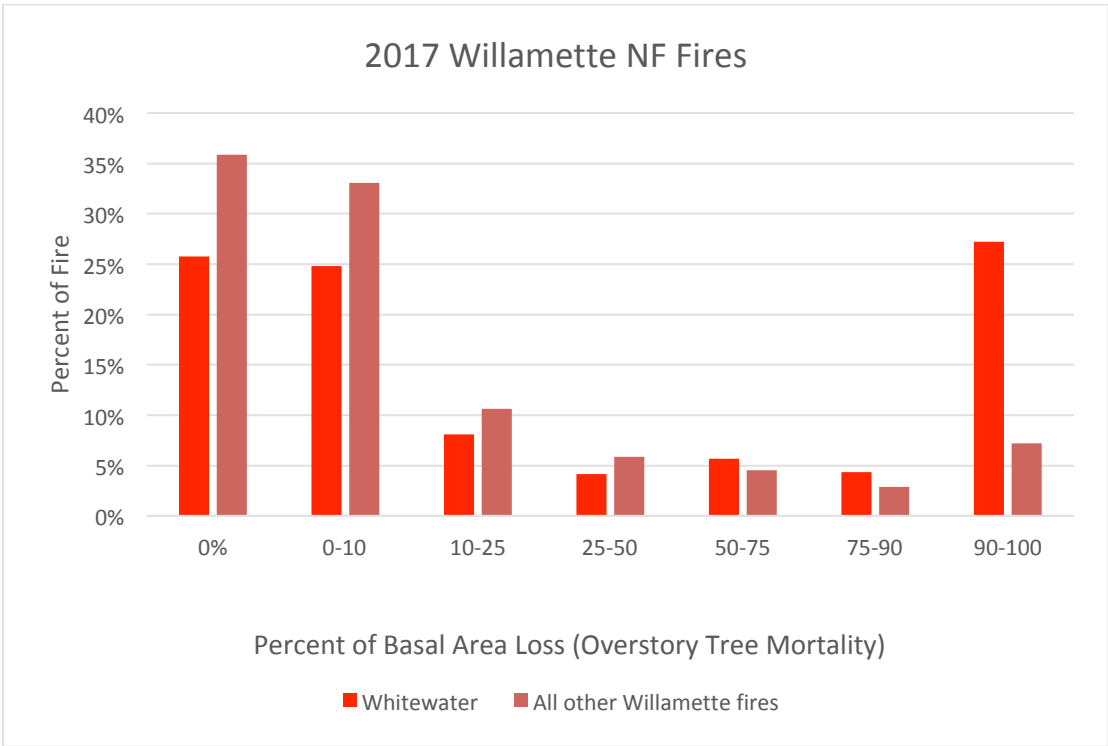
1 Deschutes does not have a backlog of unfunded post-fire restoration or
2 infrastructure repairs needs.

3 **Willamette National Forest**

4 Three BAER teams assessed fires on Willamette National Forest over the course of
5 the fire season. Like the Umpqua fires, the majority of the soil burn severities were
6 low to very low. Several BAER treatments approved for these fires include road and
7 trail work, including the Pacific Crest Trail; hazard warning signs; and invasive plant
8 treatments.



9



10

Figure XX. Percent of basal area mortality for the Whitewater fire and then all other fires combined during the 2017 fire season on the Willamette National Forest.

Willamette National Forest had 17 fires for a total of approximately 70,000 acres. The largest fire, Separation (about 8,000 acres) was primarily in wilderness (91 percent), while the Whitewater fire, the next largest fire (about 11,500 acres) burned in wilderness (56 percent) and late successional reserves (44 percent). Whitewater fire had the highest amount of tree mortality with 37 percent of the total fire experiencing greater than 50 percent overstory mortality (Figure XX). The other fires across the Willamette primarily burned at low intensity, with over 50 percent of the total burned area experiencing less than 10 percent overstory mortality (Figure XX). Forest leaders are reopening the approximately 88 miles of road affected by the 2017 fires by removing roadside danger trees. Finally, forest managers have identified approximately \$1.4 million in currently unfunded post-fire recovery needs to stabilize the road system, restore infrastructure damaged by the fires and restore vegetation (Table XX). The Forest Service is pursuing options for funding some of these post-fire restoration needs as the Willamette does not have the needed funding.

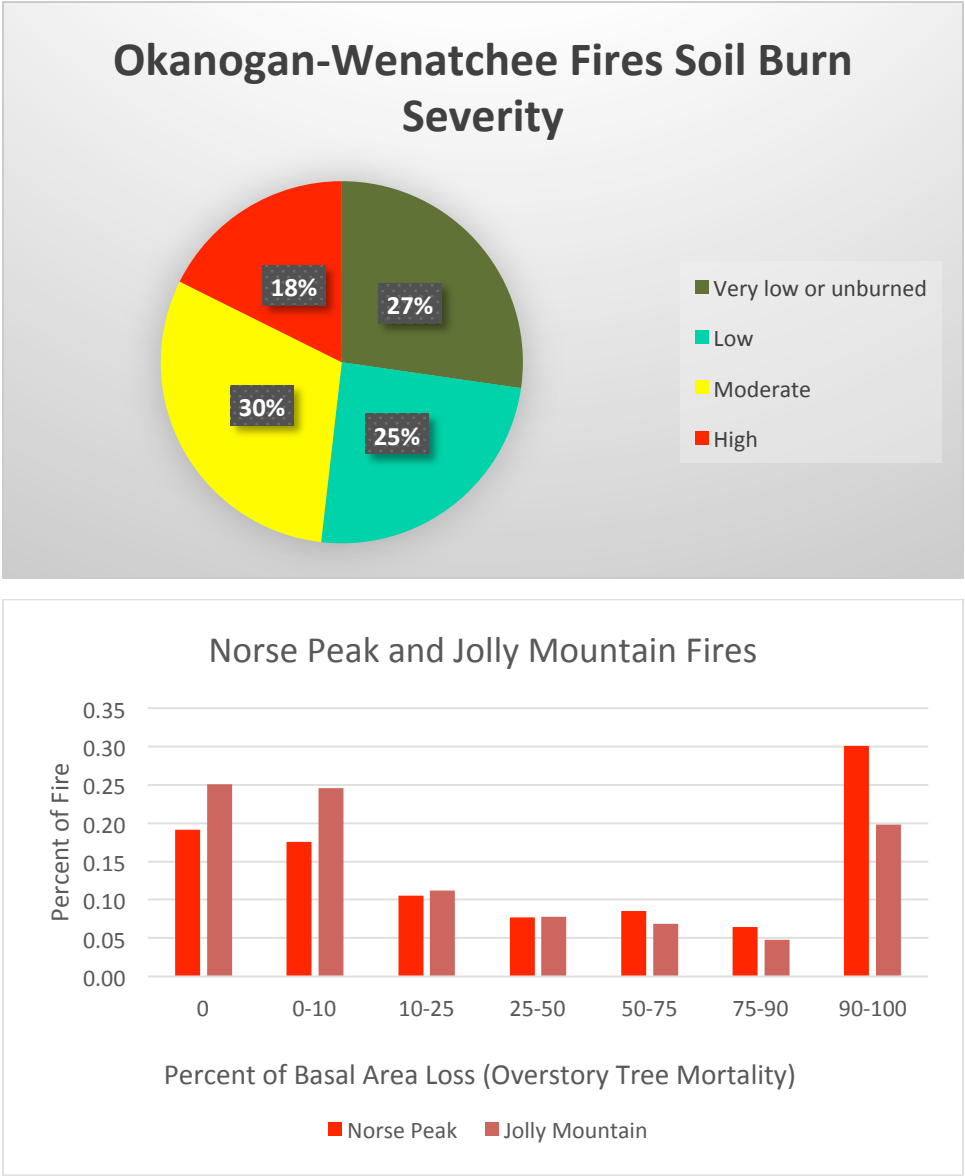
Table XX. List of currently unfunded post fire recovery needs for the all of the fires that burned Willamette National Forest in 2017.

Activity	Estimated Damage/ Needs	Units	Unit Cost	Cost
Road prism	85	miles	\$5,000	\$425,000
Trails	65	miles	\$3,000	\$195,000
Trail Structures	5	structures	\$10,000	\$50,000
Hazard tree removal (roads, trails or other areas)	90	miles	\$2,000	\$180,000
Jefferson Park and PCT dispersed site hazard trees	50	sites	\$2,000	\$100,000
Developed Rec Sites	15	sites	\$5,000	\$75,000
Administrative sites	3	sites	\$5,000	\$15,000
Partnership Coordination	1	each	\$15,000	\$15,000
Invasive Species	525	acres	\$70	\$36,750
Revegetation Needs	2500	acres	\$120	\$300,000
Willamette Total Post-Fire Funding Needs				\$1,391,750

Okanogan Wenatchee National Forest

Two BAER teams assessed multiple fires on the Okanogan-Wenatchee National Forest in October 2017. The BAER teams found a much higher soil burn severity on these fires, potentially a reflection of repeated fires on the landscape. BAER

1 treatments included hazard signage, road and trail treatments, recreation facility
2 protections, and invasive plant treatments.

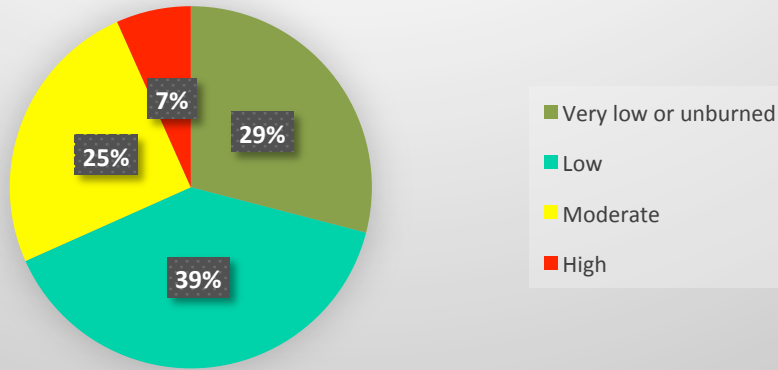


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5 **Figure XX.** Percent of basal area mortality for the Norse Peak and Jolly Mountain
6 Fires on the Okanogan Wenatchee National Forest.

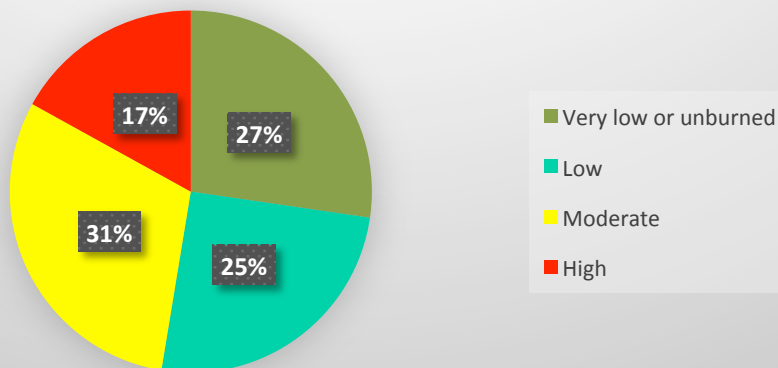
7 The Okanogan Wenatchee National Forest had 9 large fires which burned over
8 175,000 acres within the Forest. About 130,000 acres were within designated
9 wilderness. Two of the largest fires with portions outside of wilderness were the
10 Jolly Mountain and Norse Peak fires, and their overstory mortality is displayed in
11 Figure XX. Since most of the wildfire acres on the Okanogan Wenatchee were in
12 wilderness, the Forest is not planning large scale roadside danger tree treatments
13 and they are not pursuing area salvage. They did not identify any unfunded post-
14 fire recovery items beyond the emergency treatments funded in the BAER process.

1 State Summaries

Oregon National Forests Fires Soil Burn Severity



Washington National Forests Fires Soil Burn Severity



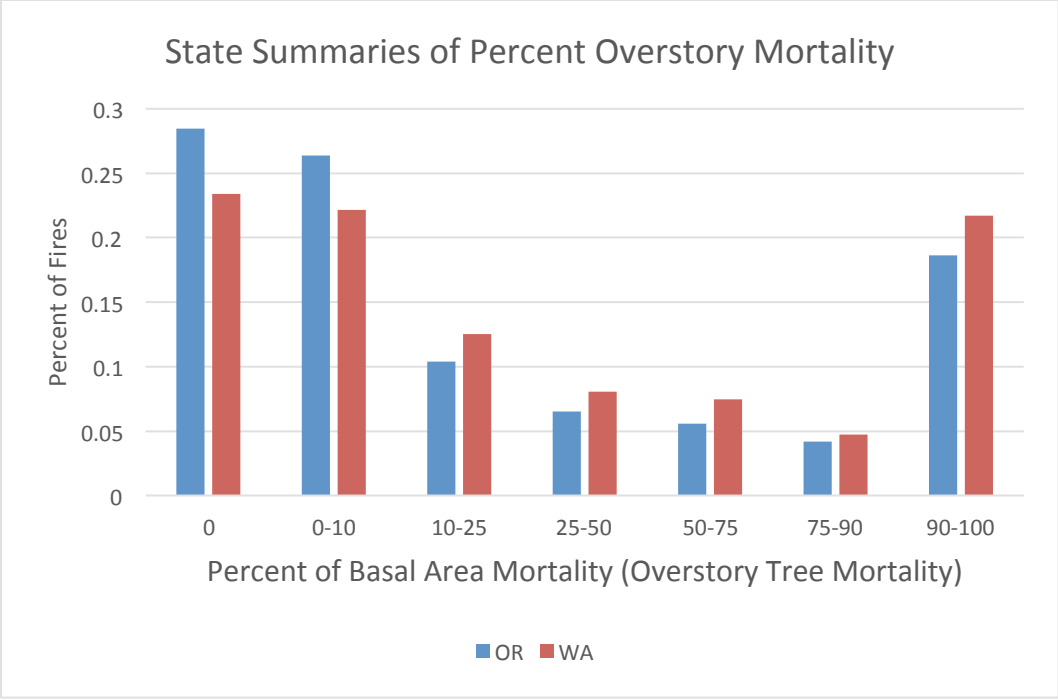


Figure XX. Combined basal area mortality for all fires assessed in 2017 in Oregon and Washington.

Table XX. Total Regional funding needs to support post fire recovery on the Columbia River Gorge National Scenic Area, Mt. Hood, Willamette, Umpqua and Rogue River Siskiyou National Forests.

Forest	Unfunded Post Fire Recovery Needs
Umpqua	\$4,060,650
Willamette	\$1,391,750
Rogue River Siskiyou	\$7,127,300
Columbia River Gorge National Scenic Area and Mt. Hood	\$9,447,000
Total	\$22,026,700

1	VI. Acknowledgements
2	VII. Glossary
3	VIII. Appendices
4	Appendix A: Use of Military on Wildfires
5	



ECLIPSE REPORT



Pacific Northwest Fire Prevention Education Teams | August 28, 2017



For the past year, federal and state agencies and land managers in Oregon have been preparing for the 2017 solar eclipse. This event was expected at the peak of Oregon's wildfire season, bringing an estimated one million visitors to the state during August's hot, dry and unstable conditions. Fire managers expressed concerns about conditions that are hard to quantify and hazards that are difficult to calculate. This theme continued through various stages of planning and preparedness, as it's difficult to quantify numbers for such an unprecedented event.

In the weeks and days before the event, indicators suggested that worst-case scenarios were imminent. Oregon was expecting most visitors in the narrow 70-mile strip of the path of totality, in rural towns and counties that lacked the infrastructure to support large scale emergencies, as well as the capacity to host the amount of expected visitors. The state was already experiencing several large lightning-caused wildfires with evacuations with highway and area closures in effect. Emergency services personnel expressed concerns about potential ignitions and fast moving fires in areas with many eclipse visitors. The logistical complexity to evacuate and account for the public, and transport fire responders quickly to fires during times with high traffic congestion added to these concerns.

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The Whitewater Fire near Mt. Jefferson closed miles of trails, including 30 miles of Pacific Crest Trail and hundreds of acres of forest and wilderness, potentially pushing more visitors to central and eastern Oregon each time the area and road closures increased. In the southern portion of the state, the Chetco Bar Fire was doubling and tripling in size the days before the eclipse, one day making a five-mile run towards the coastal town of Brookings. On August 11th, the Pacific Northwest Region went into Preparedness Level 5 and campfire restrictions were in place across the state at this time.

Interagency personnel prepared fire prevention messages, and included the "Know Before You Go" and "Leave No Trace" campaigns. Multi-agency efforts focused on preparing as much as possible, yet understanding that the variety of human and environmental factors could not ever be fully taken into account. As the eclipse event drew near, fuel shortages were reported in central and eastern Oregon and traffic was backed up for 50 miles in parts of central Oregon.

Following the event, the Pacific Northwest remains at the top of the National Situation Report. The PNW is now managing the nation's highest priority incident, the Chetco Bar Fire, now categorized as a megafire, with 100,000+ acres consumed. The town of Brookings and adjacent lands have experienced level 1, 2, and 3 evacuations all at once.

As visitors continue to leave the state, indications are that fire prevention and education efforts were a success. No worst-case scenarios played out. Land management agencies report that overall, human impacts were less than expected. Finally, perhaps the best unit of measurement: no known human caused ignitions evolved into any fires of significance. The following report gives a more detailed picture about the planning and preparation that went into addressing the Oregon Eclipse Fire Prevention Education effort.

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One of the most notable successes was in fire prevention with no known human caused incidents evolving into any fires of significance.
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Portland National Incident Management Organization,
August 23, 2017



2017 Oregon Fire Prevention: Cooperation and Early Preparedness



The Pacific Northwest Wildfire Coordinating Group's Communication Investigation Prevention Committee (PNWCG CPIC) began work in 2016 on interagency wildfire prevention campaigns and shared messages focused on the anticipated 1,000,000 visitors to witness Oregon's Total Solar Eclipse. All PNWCG partners shared concern for human-caused wildfires at the peak of wildfire season. The committee agreed to a 2017 summer schedule of PNWCG CPIC press releases with key messages targeting specific fire causes. The group continued work on shared messages and partnerships leading up to Wildfire Preparedness Month in May, the summer recreation season, and various eclipse-related topics, such as coordinated fire restrictions.

In February, public affairs staff from three national forests in eastern Oregon contacted the State Office/Regional Office (SORO) requesting Fire Prevention Education Teams (FPETs) to help prepare prevention materials and conduct eclipse outreach. Soon after, other units began to inquire about hosting an FPET for the eclipse. Based on these initial requests, SORO's Fire Mitigation Education Specialist began to develop a seasonal FPET strategy. The goals included pre-planning for the eclipse event to support and mitigate anticipated issues stemming from high visitor numbers and expected human-caused wildfires, developing materials and distribution/outreach strategies, and providing for oversight and prevention support to field units during the eclipse event.

In June, a five person Fire Prevention Education Team assembled in Bend and worked for two weeks to refine this strategy. The team developed a communication plan with key wildfire concerns, messages, and strategies. It created an eclipse logo with internationally recognized Smokey Bear to unite the wildfire prevention message across all agencies and organizations. Team members engaged various field-going personnel and partners in brainstorming prevention education products and additional messages. It established criteria to filter funding and development priorities, and designed and ordered products through the Government Publishing Office (GPO). This included prevention education products targeting specific human fire causes, user groups and customers. The team also reviewed electronic resources on the SORO fire prevention FTP site, and created additional electronic prevention education resources for local adaptation in 2017, including more Spanish translations. A social media campaign was designed with graphics and seasonal messages and scheduled for the PNWFAC Twitter account. Work was done with field units requesting FPETs to begin draft delegations of authority, and to coordinate on team logistics and focus areas. The June team also worked with the Confederated Tribes of Warm Springs and the Regional Prevention Coordinator for the Bureau of Indian Affairs to support shared prevention graphics and messages and on preparing for a BIA-sponsored FPET at Warm Springs.

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Graphics, materials, and translations



In the month before the eclipse, a short team worked with the GPO team in SORO to amend, finalize and submit additional product orders, coordinate delivery and plan for dissemination of products. The short team coordinated logistics: travel, hotels and housing, particularly during the limited availability of accommodations on the days before and after the eclipse. Field FPET preparation also included work to finalize in-briefing dates, submitting resource orders, assembling welcome packets, and coordinating the allocation and transportation of numerous products. The field teams received their first batch of products that included table tents, rack cards, patrol cards, road signs, large and small banners, wooden trading coins, and stickers. As other products trickled in, the teams received 'no fire' campfire pin-flags, trash bags with fire prevention messaging, and bumper stickers. Products were distributed equitably among the teams, and shared with our cooperating Warm Springs team.



Public Service Announcements in Spanish

Capacity building in the Pacific Northwest



In addition to the field teams, a Fire Prevention Education Team (FPET) was deployed in Portland to support the three field Fire Prevention Education Teams in NE Oregon, Central Oregon and NW Oregon. The Portland FPET (PDX FPET) coordinated product delivery locally to the Columbia River Gorge National Scenic Area, Mt. Hood National Forest, the State Office/Regional Office (SORO), and the National Incident Management Organization (NIMO) team coordinating Eclipse efforts. The Northwest Coordination Center (NWCC), Multiagency Command (MAC) also received product samples at this time. In addition to the products ordered, supplementary fire prevention materials were available for local customization through the FTP website. These products were used by the Washington Office and sent out through the Regional Prevention Coordinator List.

Additional requests were received from the Washington Office to expand the eclipse fire prevention campaign. The PDX FPET created adaptations based on the original Oregon eclipse logos for 12 states within the path of totality. These products were updated to include the USFS and USDA logos for broader application. 1

As a final product, the PDX FPET revised and updated a set of 10 sage grouse educational trading cards to incorporate changes recommended by the USFS Regional Wildlife Ecologist. The changes include updated, high-resolution images, secured with permission from the Oregon Flora Project. The team edited the wording on the text to match age appropriate fire prevention messaging.

The team supported the region by providing Spanish translations for daily briefings and press releases for fires in Oregon and Washington. The FPET collaborated with the Region 6 Fire PAO to produce Public Service Announcements (PSAs) explaining evacuation levels in Spanish. These PSAs were distributed via a link on the InciWeb homepage, and to Incident Management Teams (IMTs), through a PAO and PIO mailing list. The full repertoire includes a three-minute video, a condensed 60 second audio file, accompanying scripts, and formatted text documents for print. The full scope of PSA related products can be found here: http://ftp.nifc.gov/incident_specific_data/pacific_nw/!SORO/Prevention/Bilingual_Materials/2017_Spanish_PSA_Soto/

In 2014, the fire season in the Pacific Northwest was precedent-setting, as established by record weather and persistent fire occurrence in early spring. Fire Prevention Education Teams were deployed almost continuously through September. The demand for teams revealed a clear and persistent shortage of qualified and available Fire Prevention Education Team Leaders, Team Members and Public Information Officers within the Pacific Northwest. A capacity-building strategy was prepared outlining the needs and mitigation measures. As a result, in 2015 and 2016, Fire Prevention Education Team Member (P-310) courses were taught on a virtual course delivery platform, with locations in Tucson and Boise, each including pods in seven western states. The Pacific Northwest and Alaska contributed cadre, pod locations and students. In addition to this formal training, enhanced recruitment efforts were made to bring in talent by referral and interest in the FPET program through networking, at conferences and workshops, and assignments to other regions, such as the extensive deployment of FPETs in the fall of 2016 to the Southern Region. As a result of these efforts, two PNW/AK employees attended Team Leader training in the fall of 2014, and 22 employees completed Team Member Training. The Pacific Northwest has offered significant team training opportunities, deploying seven FPETs each in 2014 and 2015, three FPETs in 2016 and six in 2017, including the team hosted by the Warm Springs Reservation.

2017 Pacific Northwest Fire Season

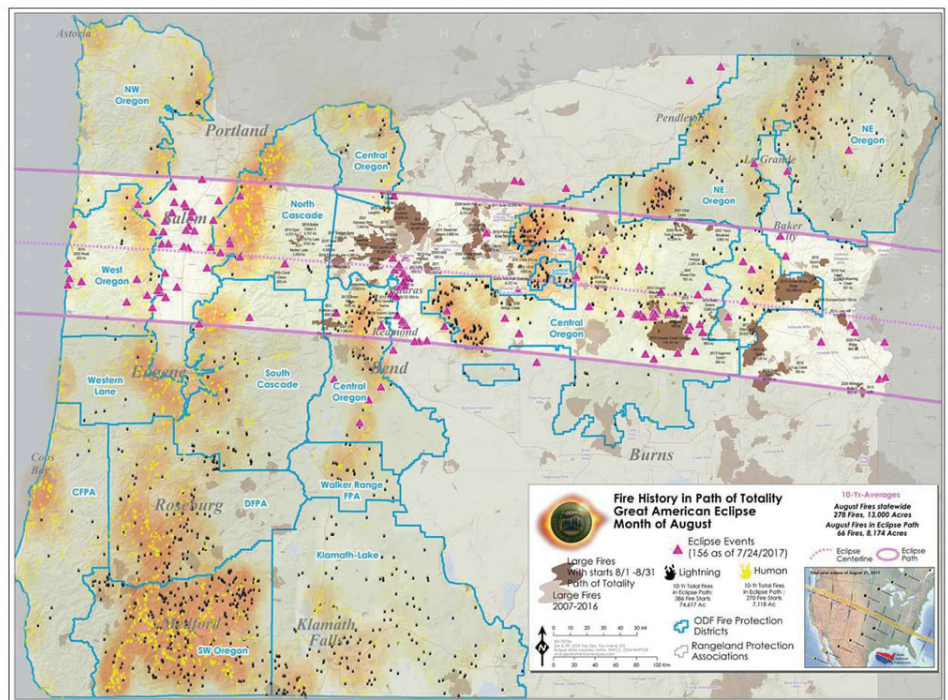


Leading up to the August 21 Solar Eclipse, the Pacific Northwest experienced extreme fire danger indices and record temperatures. Lightning storms moved through the area the week prior, igniting several fires in Oregon and Washington. Beginning with one of the earliest fires west of Mt Jefferson, a location expected to see at least one group of 1,000 hikers, agencies began to receive inquiries from potential visitors concerned that the smoke would 'still be there' during the Eclipse. Many of these fires continued to grow into project fires, with residents and visitors heavily impacted by smoke, highway closures and evacuations in the days just prior to August 21.

As fire danger escalated, land managers implemented public use restrictions limiting campfires, smoking, off-road vehicle use, etc. Industrial regulations were advanced as well, closing down most operations without specific waivers limiting use to certain times of day, and with extra precautions. By August 15, campfires were banned in nearly all of Oregon's federally and state-protected wildlands. Because of the media attention related to these wildfires, meteorology predictions about visibility, the resultant smoke, and risk of wildfire, the actual Eclipse visitation was reduced.

Beginning on August 19th, the crowds began to move to planned events, the largest of which was expecting 30,000 participants. Over 70,000 actually arrived. Other areas such as portions of the Coast and Northeast Oregon received less than expected visitation, with crowds shifting to other areas.

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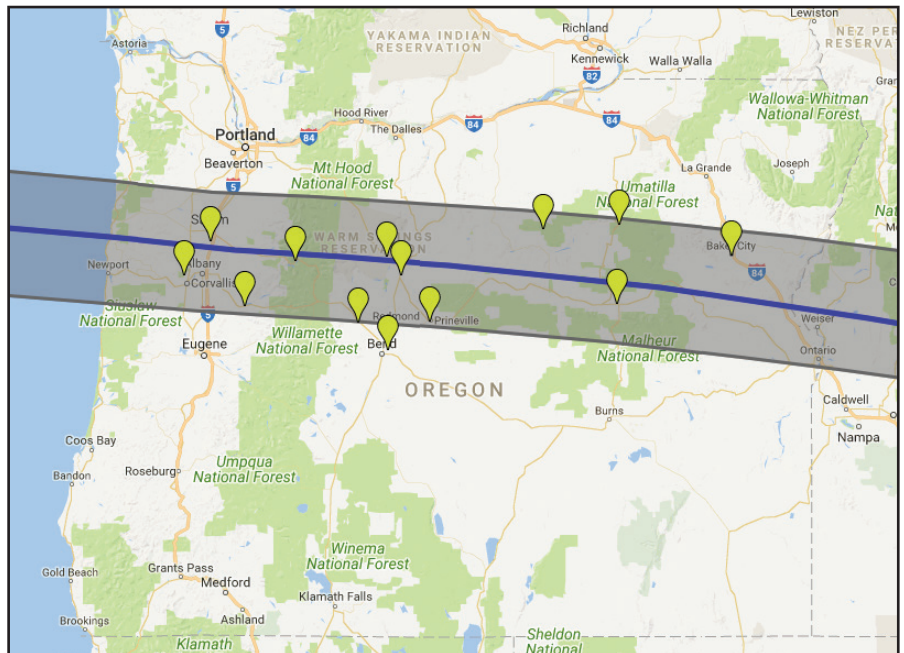


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Fire Prevention Education Team Highlights



The three field teams were made up of 16 people total, tasked with implementing fire prevention messaging in and across nine national forests, grasslands, and Bureau of Land Management (BLM) and state protected lands in and near the path of totality. In the western part of the state, one team worked for the Willamette National Forest, Siuslaw National Forest, and the Northwest Oregon BLM District. In central Oregon, a team worked for the Deschutes National Forest, the Ochoco National Forest, and Prineville BLM District. Finally, in northeast Oregon, a team served the Malheur National Forest, the Wallowa-Whitman National Forest, and the Umatilla National Forest. The Warm Spring Reservation also hosted an FPET. The field teams focused on providing information along roads and gateways into the path of totality. They targeted messaging along roadsides, information portals and info stations, at events and public gathering places, and in and near campfire pits. By the time the teams demobilized, they had made 14,839 public contacts in 591 distinct locations and covered thousands of miles of Oregon roads.



Fire Prevention Education Team locations



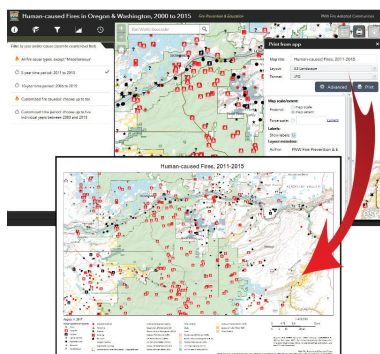
Fire Prevention Education Team Highlights



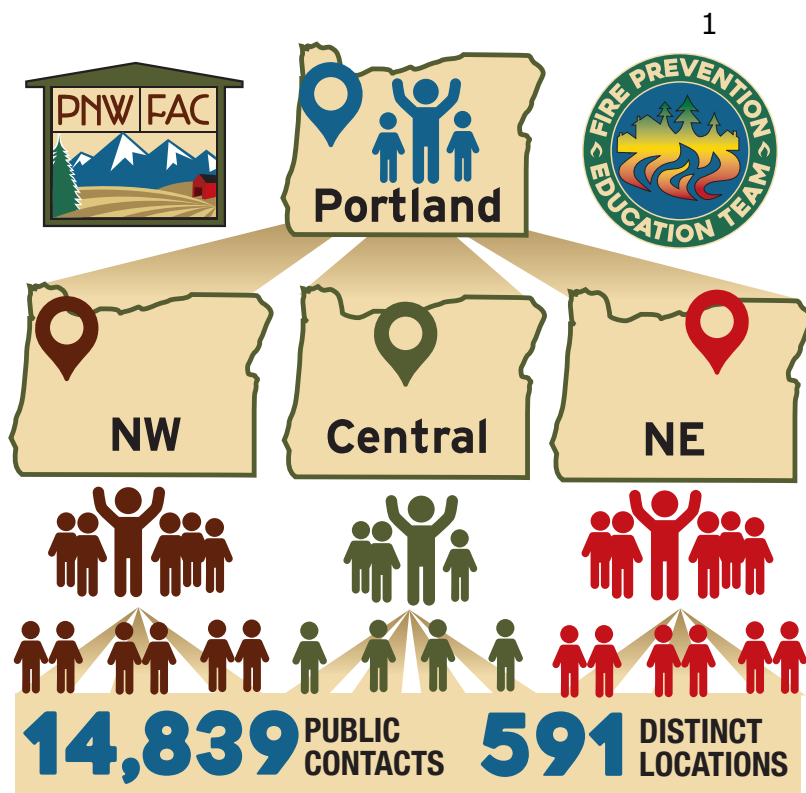
Photo by Mark Stone/University of Washington



Oregon/Washington human-caused fire website



Memorable events included numerous county fairs, and local events. At Warm Springs, the prevention education team, along with Smokey Bear, sponsored a prevention booth at a National Aeronautics and Space Administration (NASA) Program for Youth from thirteen tribes including a project to launch and track giant weather balloons containing sensors and carrying culturally significant items. This was the largest effort involving Native American tribes during the eclipse. The program's goal was to bring STEM-related (Science, Technology, Engineering and Math) topics to students in culturally relevant ways.



Following three seasons of informally accessing data provided through the Forest Service Rocky Mountain Research Station to provide incoming FPETs with interagency human fire-cause data, the SORO Fire Mitigation and Education Specialist worked with Forest Service Region 6 Data Resource Management staff to develop an application for Oregon and Washington for prevention personnel and interagency partners to access and work together to address common human wildfire causes. This application is in "beta testing." Incoming FPETs were asked to provide their feedback on the application. It follows:

The NW Oregon Team conducted beta-testing of the "Human Caused Fire Activity Application for Oregon and Washington, 2000-2015." Initial observations include a strong correlation between the priority coverage areas and human-caused fire history. Their findings re-assured the team their efforts were concentrated in the appropriate area. The team continued to work with the application during their assignment. The Portland Team experienced difficulties opening the web addresses on an Apple Ipad. After numerous tries with the web address provided, it would not open on the device. The NE Oregon Team tested the website and was unable to get in when the long link was typed into the browser. The tester backed the web address up to the webappviewer ending and was able to open the site and look at the options. The zoom in/out feature worked well, the view could be changed and the site located the team. Other features were not available. Testing and modification on this application will continue.

Appendix C: Using Science and Technology to Inform Decisions

While fire management personnel have been using fire behavior models since the early 1980s, the computer interface has advanced from time-consuming punch cards to programs that allow for near-instantaneous predictions, such as BEHAVE+. Development of new technology has taken fire modeling from paper to geospatial layers of natural, cultural, and infrastructure resource complexities. The advent of LANDFIRE, a program that provides a series of data layers for vegetation, greatly facilitated the development of a number of fire behavior, smoke dispersion, and fire effects tools used to support decisions made during and after a wildfire. Many of the current science-based productions are most useful for long duration fires in forests.

Wildland Fire Decision Support System (WFDSS)

The Wildland Fire Decision Support System (WFDSS, pronounced woof'-dis) represents the current state-of-the-art technology that calculates fire behavior, such as rate-of-spread and flame length, and fire spread potential. WFDSS also serves to document the incident goals and objectives and tracks fire management decisions.

Most recently, WFDSS has added a links to near real-time geospatial information stored in the dispatching system WILDCAD. This link allows fire managers to incorporate topographic maps and provides a web-based common operating picture to multiple levels of management simultaneously.

WFDSS has four levels of geospatial fire behavior projections:

- Basic Fire Behavior – estimates fire behavior based on weather and fuel moisture inputs and analyses potential fire behavior like flame length, crown fire potential, and fine fuel moisture variance.
- Short-Term Fire Behavior – depicts fire spread pathways and arrival time of a fire over a period of hours using wind and fuel moisture inputs to estimate the rate of spread.
- Near-Term Fire Behavior – estimates fire spread and fire behavior using weather and wind data over a period of three to seven days to determine fire spread given the weather forecast for that period.
- Fire Spread Probability, or FSPro – produces multiple simulations of fire spread using weather and long-term climate records. The analyst can adjust spotting potential, use terrain to modify windspeed and direction, and alter fuel models to better reflect actual conditions.

Each time the fire behavior analyst updates a WFDSS run, a new risk assessment can be prepared, allowing the decision-maker and the incident management team to see how risk is changing over time on a given fire. The relative risk rating evaluates values at risk and their proximity to the fire along with other social and

political concerns, hazards posed by fuel conditions, expected fire behavior, the potential for fire growth, seasonal barriers to fire spread, and current seasonal severity relative to a “normal” fire season.

Lastly, WDFSS creates a recommended incident organization based on the relative risk rating, the difficulty in implementing the course of action described, and social-political concerns related to the fire, such as mixed ownerships. The result is a recommended incident organization, such as a Type 2 or Type 1 incident management team.

Smoke Forecasting

The fire managers and air quality regulators now have access to a number of smoke modeling tools to assess expected smoke production, transport, and dispersion in near-real time. To help incident management teams, fire agencies, and the public make use of these new tools, we now have Air Resource Advisors.

Air Resource Advisors have technical expertise in air quality monitoring, smoke modeling, pollutant health thresholds, and communicating smoke risks and potential mitigation measures. When dispatched to a wildfire, their specific tasks include:

- Providing, installing, and operating air quality monitors and interpreting the resulting data for fire camps and communities as needed,
- Summarizing information about current air quality conditions, comparing them to national health thresholds and communicating those findings to partner agencies and the public,
- Using and interpreting national smoke models and running fire specific models to provide forecasts of future air quality impacts,
- Assisting Safety Officers and others in addressing firefighter impacts from smoke,
- Advising on how to reduce risks and mitigate smoke exposure of the public and firefighters,
- Supporting incident management teams in public meetings and in media such as Inciweb, AirNow, and smoke blogs, and
- Coordinating with public health agencies and air quality regulators to address their concerns about smoke impacts on the public.

In 2017, Air Resource Advisors were used on the Diamond Creek Fire, central Washington Fires Support, Eagle Creek Fire, Whitewater Fire, east Cascades fires, Blanket Creek Fire, North Umpqua and High Cascades Complexes, Chetco Bar Fire, southwest Oregon fires, and the Miller Complex. A typical smoke outlook produced by an Air Resource Advisor describes the current fire activity, expected smoke

1 impacts, and the expected Air Quality Index for nearby communities. Because of
2 the duration of the fires where Air Resource Advisors were used, most fires had
3 several advisors over the summer and sometimes two advisors were assigned. For
4 example, the Blanket Creek Fire had a total of five Air Resource Advisors with
5 overlapping advisors between August 20 and September 3.

6 Risk Management and Assistance Teams (RMAT)

7 In 2017, the Forest Service began testing the use of Risk Management Assistance
8 Teams to help managers, cooperators, and the public better understand the risks
9 posed by large and complex fires. A Forest Supervisor or District Ranger typically
10 requests an RMAT when they need help in determining priorities between several
11 fires or are unsure of the best approach to use on an individual fire. Using a risk
12 assessment, the team identifies the locations and lists of values that warrant
13 protection from fire and then uses FSPro in WFDSS to estimate the probability that
14 the fire will reach the locations of those values. RMAT findings can be used by a
15 local unit, area command, multiagency command, geographic coordination center,
16 or agency to prioritize fires when firefighting resources become scarce.

17 RMATs in the Pacific Northwest used the 2017 draft Quantitative Risk Assessment
18 product to inform a variety of analyses concerning long-duration fires and complex
19 fires. The Quantitative Risk Assessment product was developed last winter and
20 spring by refining the LANDFIRE fuels layer, identifying the high value resources
21 and assets, developing expected changes in value should a fire reach the identified
22 resource or asset, and ranking the relative importance of the results.

23 Assets can include residences, communication sites, transmission and distribution
24 lines, railroads, major roads such as interstates and state highways, developed and
25 dispersed recreation sites, ski areas, historical structures, seed orchards, and mills.
26 High-valued resources can include commercial timber, municipal watersheds,
27 federally threatened or endangered species habitat, and sensitive species habitat.

28 In 2017, the Forest Service established three RMATs nationally. Each team consists
29 of a line officer with experience in dealing with large fires, a fire management
30 officer, an operations/risk management specialist such as an Operations Section
31 Chief or a Strategic Operational Planner, a local fire behavior specialist, and two
32 long-term fire analysts. The team can create a number of products, depending on
33 the needs and questions concerning an individual fire or fire complex:

- 34 • Conditional Net Value Change (cNVC) Map(s) – given fuels and expected fire
35 behavior a map or series of maps of the expected benefits and losses for
36 designated high value resources and assets.
- 37 • Fire Behavior Analysis – uses fire behavior modules within WFDSS to
38 characterize expected fire behavior and spread and for use in additional tools

1 to assess potential threats to values and natural resources and to evaluate
2 mop-up hazards in the fire area.

- 3 • Exceedence Probability (EP) Curves – compares the expected losses or
4 benefits from a group of fires to help set priorities.
- 5 • Estimated Firefighter Evacuation Time Map – models the shortest ground
6 transportation time in hours from any given point to a hospital. The travel
7 time estimate begins from the moment a litter is lifted off the ground and
8 travel begins, so does not include the time needed to prepare the injured
9 person for evacuation or acquire the needed transportation. It estimates
10 walking speeds as adjusted for slope and vegetation type and driving speed
11 based on the types of roads traveled.
- 12 • Mop-up Hazard Rating Map – identifies where vegetation types and slope
13 steepness align to create potentially hazardous conditions for firefighters
14 during mop-up. Incident management teams and decision-makers can
15 combine this map with infrared imagery of hotspots and areas of intense
16 heat to prioritize areas for mop-up and avoid areas that are rated as largely
17 unsafe or have little need for mop-up.
- 18 • Suppression Difficulty Index (SDI) Map – identifies areas with high exposure
19 to unsafe conditions and little ability to mitigate those safety risks, taking
20 into account potential fire behavior, access, fireline production rates, and the
21 availability of fuel breaks created by natural features or by fuels treatments.
- 22 • Potential Control Location (PCL) Map – depicts where the landscape is highly
23 suitable or generally not suitable for stopping the fire by identifying potential
24 control features. It assumes that the firefighting effort is consistent with past
25 fires in the area.
- 26 • Tree Mortality Map – identifies areas with high levels of tree mortality and,
27 therefore, increased firefighter exposure to snags. This product also supports
28 the Suppression Difficulty Index, Potential Control Location, and Mop-up
29 Hazard analysis.
- 30 • Incident Timeline Graph – provides a visual depiction of the size, costs,
31 number of personnel, percent contained and remaining to be contained, fire
32 danger, strategies used, relative risk assessment level, organizational needs
33 assessment level, assigned team type, structures threatened and destroyed,
34 and decision status. This product can be used in briefing in-coming incident
35 management teams and as a tracking tool over the life of the fire.
- 36 • Incident Resource Use Graph – a supplement to the Incident Timeline Graph,
37 this graph depicts the amount and type of firefighting resources assigned to
38 the incident as well as the costs and fire size as reported on the ICS-209
39 form.

- Aviation Use Summary Package – summarizes and maps aviation actions on the fire such as retardant and water drops from airtankers and helitankers, the exposure of aviation assets to safety hazards over time, and the number and type of aircraft assigned to the fire each day.

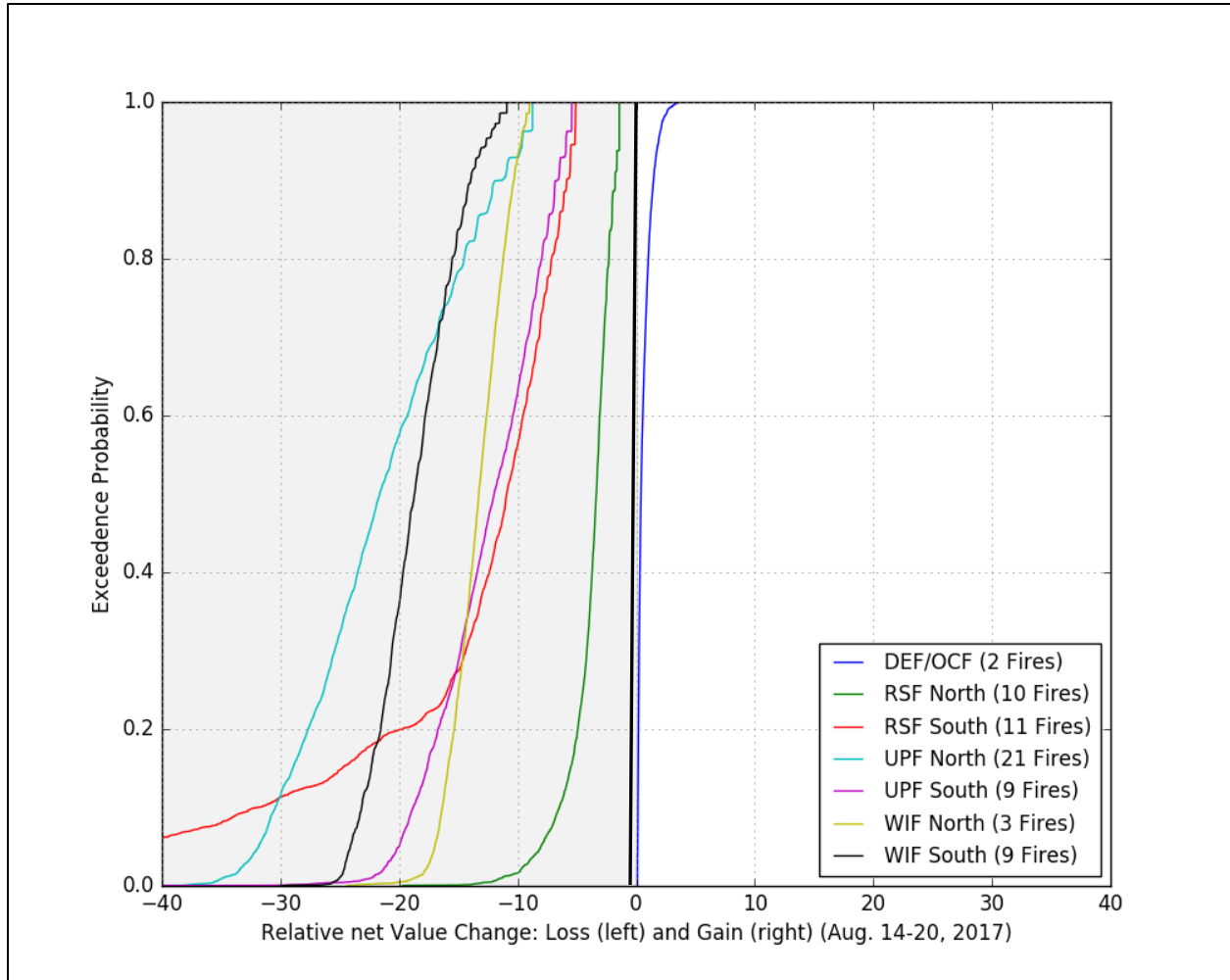
Some or all of the above products are used to develop a trade-off analysis where different potential fire fighting strategies are evaluated against firefighter safety, public safety, and the values at risk from the fire. The RMAAT uses standardized tables to develop scores for how well each alternative course of action meets the fire management objectives and protects firefighter and public safety, as well as scoring the likelihood of success and the social and political concerns with a given course of action.

In 2017, RMAATs were used by MAC Support and the Willamette, Umpqua, Rogue River-Siskiyou, and Okanogan-Wenatchee National Forests. For MAC Support, the RMAAT evaluated 65 fires on the Umpqua, Willamette, Deschutes, and Ochoco National Forests in mid-August and developed Exceedence Probability Curves. The team grouped the fires into seven clusters to evaluate the expected net loss or benefit.

This analysis indicates that the northern Umpqua (UPF North) and the Willamette (WIF North and WIF South) are most likely to see the highest net loss over the next seven days in the absence of any suppression action (Figure x). The southern Umpqua (UPF South) and southern Rogue River-Siskiyou (RSF South) were expected to see mild to moderate loss, while the northern Rogue River-Siskiyou (RSF North) could see a mild loss in the absence of any suppression action. Further, the expected loss on the northern Rogue River-Siskiyou expected losses were half those expected for the southern Umpqua and southern Rogue River-Siskiyou. The Deschutes and Ochoco National Forests (DEF/OCF) were expected to see a net resource benefit from the two fires assessed (Milli and Belknap). As a result, the recommended priority for firefighting resources was:

1. Umpqua National Forest North
2. Willamette National Forest South
3. Willamette National Forest North
4. Umpqua National Forest South/Rogue River Siskiyou South
5. Rogue River Siskiyou North
6. Deschutes/Ochoco National Forest

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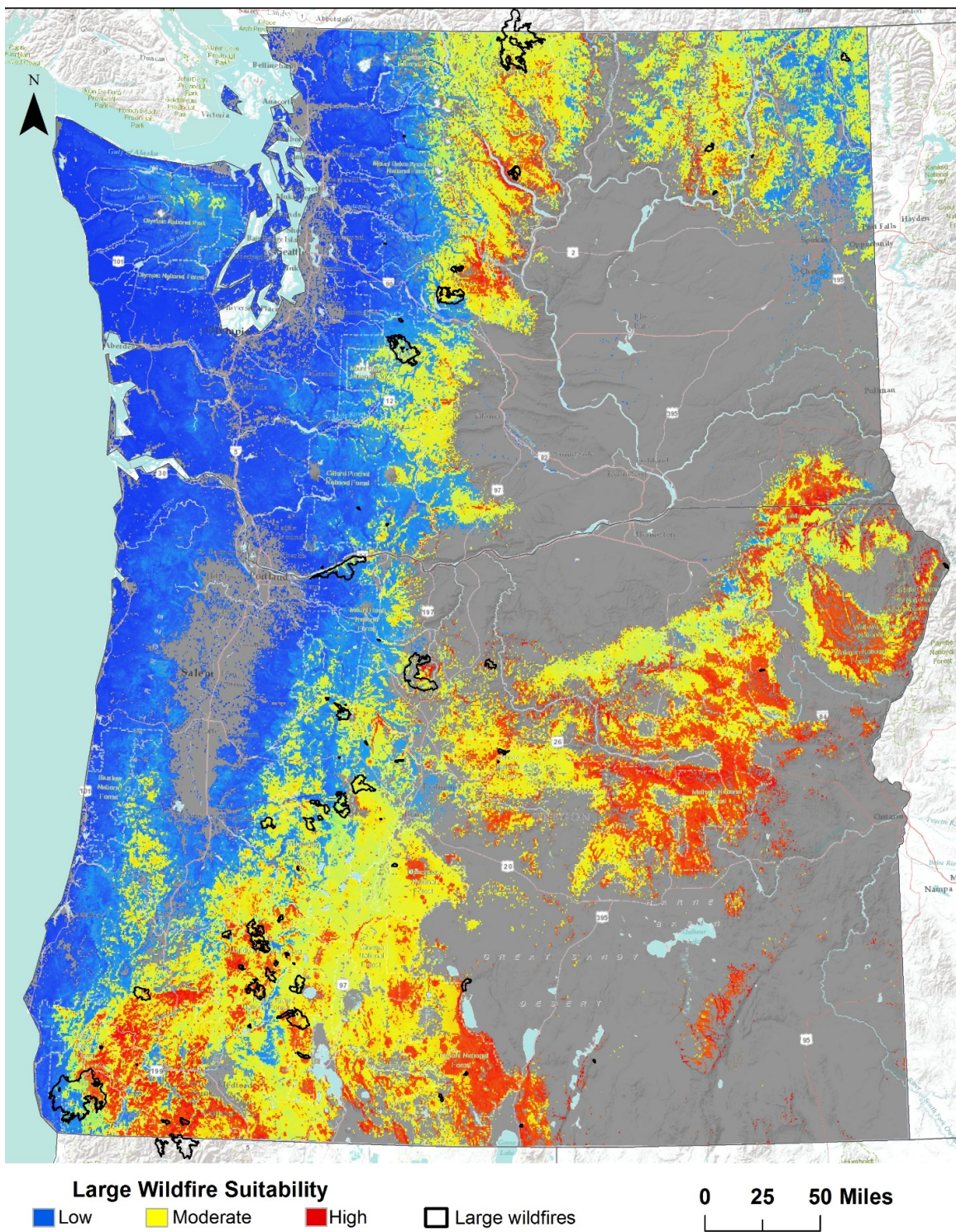
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3 On the various National Forests, the team conducted trade-off analyses of selected
4 fires and complexes to aid in selecting which strategy to use, help the incident
5 management team prioritize resource use, and to help the Rogue River-Siskiyou
6 and Umpqua National Forests align their strategies for several fires along their
7 common boundary.

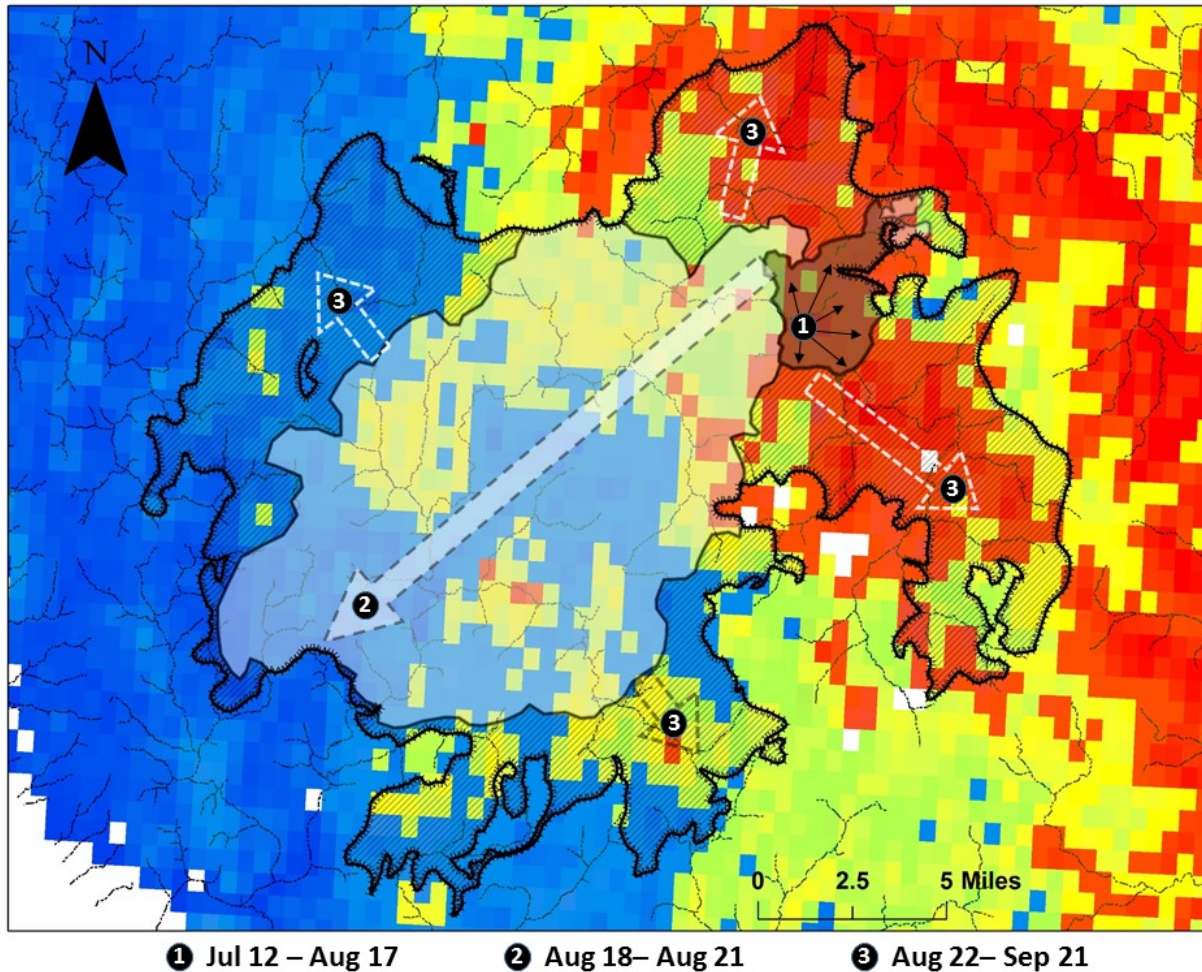
8 "Habitat" for Fire

9 Although not widely used, scientists in the Northwest have developed an
10 experimental product that maps the "habitat" for large forest fires based on
11 measures of climate during the main fire season, topography, distance from roads,
12 historical lightning ignitions, and solar radiation. The model assumes that burnable
13 fuels are highly likely to be present, so are not included. The resulting map depicts
14 probabilities that an area would support the development of a large forest fire.
15 Warmer colors in the map (reds, oranges, and yellows) indicate higher probabilities
16 while cooler colors (blues and greens) indicate lower probabilities. Although the

- 1 cooler colors indicate lower probability, these areas can burn under extreme
- 2 weather conditions.



1 For example, the Checto Bar Fire started in a high probability area and largely
2 stayed within the area of warmer colors through the early part of the fire. Once the
3 so-called Chetco Effect wind hit, it pushed the fire into a lower probability area.
4 After the wind died, the fire continued to spread in the warmer colors, including
5 light blue areas but showed little spread in the cooler areas until the next wind
6 event.



9 Infrared Mapping

10 Infrared, or thermal, mapping is widely used to track wildfire growth and identify
11 heat across a fire. Infrared technology has advanced greatly in recent years. The
12 National Interagency Fire Center in Boise staffs and maintains the National Infrared
13 Operations Unit. The unit consists of aircraft, thermal imaging cameras, infrared
14 interpreters, and geographic information systems. The aircraft fly over several fires,
15 usually at night, and download the imagery to the interpreters who convert the
16 splotches, sqiggles, and dots into the fire edge, hotspots, rocks, roads, streams,

1 and other terrain features into maps firefighting teams can use to develop or
2 update daily plans for managing the fire as well as tracking the size of the fire.

3 Unmanned Aircraft Systems/Drone Use

4 Drones in the fire zone have had a historically negative association. When drones
5 and unmanned aircraft stray into the closed airspace over a fire, they present a
6 significant collision risk to the firefighting aircraft and can ground aircraft that are
7 conducting critical operations like retardant drops, water drops, and crew shuttling.

8 This year, the federal fire agencies have started to train managers to use
9 unmanned aircraft systems for to conduct fire reconnaissance and support
10 development of fire management strategies and tactics. This year, unmanned
11 aircraft systems were used to conduct infrared mapping when regular infrared
12 flights were grounded due to smoke and lack of visibility. They were also able to
13 record and stream their flight path in real time. In 2017 it proved to be a useful tool
14 that greatly supplemented traditional firefighting efforts. Incident management
15 teams used unmanned aircraft on the Umpqua North Complex and on Eagle Creek
16 Fire.

17

Appendix D: Air Quality and Smoke

The 2017 fire season had significant and lasting effects on air quality across the states of Oregon and Washington. Smoke resulted in a number of health impacts, often affecting even healthy people, as well as impairing visibility for a prolonged period. On the worst days, visibility was limited to less than one mile. Along with impacts to human health, dense smoke resulted in temporary road closures and required people to travel at reduced speeds when roads were open. The iconic volcanoes in the Cascades were largely invisible for much of the main tourism season. Smoke resulted in decreased tourism, adding to the economic impacts of the 2017 fire season.

How is Air Quality Measured?

Air quality regulators and the federal agencies use the Air Quality Index (AQI) to characterize the impact of different concentrations of smoke on human health. The Environmental Protection Agency (EPA) developed the AQI to provide a simple indicator of the potential impacts of air pollution on human health. The AQI is based on the levels set particles 2.5 microns and smaller (PM_{2.5}) and ozone. In the case of smoke, the pollutant of concern is PM_{2.5}.

AQI Category	24-hour PM _{2.5} concentration (ug/m ³)	Meaning
Good	0-12	Air pollution is considered satisfactory and poses little or no risk.
Moderate	12.1-35.4	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	35.5-55.4	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy (for everyone)	55.5-150.4	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	150.5-250.4	Health alert: everyone may experience more serious health effects.
Hazardous	250.5-500	Health warning of emergency conditions. The entire population is more likely to be affected.

Daytime vs. Nighttime Smoke Impacts

Smoke impacts may be worse during the day or during the night, depending on the speed, size, and complexity of fire spread, on atmospheric stability, and on the topography. Rapidly moving fires in heavy timber produce very high volumes of smoke. Typically, that smoke rises, gets carried by higher level winds and then to

1 mixes to ground level some distance from the fire. In extreme cases, smoke from a
2 large and rapidly spreading fire can affect the air quality in communities hundreds
3 of miles away.

4 Warming temperatures during the day help create wind that moves smoke around.
5 At night, temperatures tend to cool, winds die down and smoke starts to flow
6 downhill and down drainages into valleys.

7 Topography can trap smoke into an area, particularly at night. Drainages that
8 become wider for a short distance and then narrower tend to trap smoke in the
9 small valley at night. A comparison of the air quality in Oakridge and Eugene
10 illustrates how nighttime smoke can affect the air quality in one area of a river
11 drainage, but not another. Both communities lie on the Middle Fork of the
12 Willamette with Oakridge located within the Willamette National Forest and Eugene
13 in the Willamette Valley. Air quality in Oakridge was Moderate or worse through
14 most of August while Eugene had many days of Good air quality. Oakridge was
15 affected by nighttime smoke from several fires in the central Cascades that became
16 trapped in the small valley where Oakridge sits. That smoke never made it as far
17 down as Eugene. The nighttime smoke concentrations grew worse as August
18 continued, reaching Unhealthy or worse levels by August 27 while Eugene
19 experienced a range of air quality, including several days when the air quality was
20 Good. On August 3, air quality was worse in Eugene than in Oakridge, suggesting
21 that Eugene had a greater impact from daytime smoke than Oakridge did. In early
22 September, both locations were greatly affected by smoke as several complexes in
23 the central Cascades experienced large growth.

24 Several locations in Oregon and Washington are well known for trapping smoke due
25 to topography. Some of these are also designated as non-attainment areas under
26 the Clean Air Act. In western Oregon, the Rogue River Valley and Oakridge are the
27 best known smoke traps. Smoke can become trapped in the southern Willamette
28 Valley as well, although it happens less often in the summer than in other locations.
29 In eastern Oregon, Sisters, Bend, Klamath Falls, Lakeview, La Grande, John Day,
30 and Burns can become smoke traps. The Dalles has the right topography to be a
31 smoke trap, but is downstream from mostly grassland fuels that rarely create the
32 same type of smoke problems as forest fuels. In Washington, the known smoke
33 traps are in the eastern part of the state, largely because that is where the large
34 fires typically occur. Well known smoke traps include Yakima, Leavenworth, Chelan,
35 Wenatchee, Omak, Winthrop, Twisp, and Republic. Several communities in
36 northeastern Washington might also be smoke traps, such as Metaline Falls and
37 Kettle Falls, but typically do not experience frequent large fires in the area.

Date	Oakridge	Eugene - Highwa
8/1/2017	6.2	6
8/2/2017	14.2	31.2
8/3/2017	40.1	56.1
8/4/2017	34.2	27.1
8/5/2017	11	6.7
8/6/2017	9.7	11.8
8/7/2017	17.3	17
8/8/2017	34	34.5
8/9/2017	42.1	30.2
8/10/2017	29.3	24.1
8/11/2017	16.8	9.7
8/12/2017	12.5	2.6
8/13/2017	4.6	2.1
8/14/2017	13.1	4.2
8/15/2017	22	7.3
8/16/2017	25.6	6.2
8/17/2017	12.3	2.8
8/18/2017	25.5	2.8
8/19/2017	20.5	2.1
8/20/2017	40.7	3.2
8/21/2017	42.5	5.2
8/22/2017	43.6	5.7
8/23/2017	26.2	5.7
8/24/2017	6.7	5.4
8/25/2017	11.3	6.6
8/26/2017	39.3	9.2
8/27/2017	74.6	38.7
8/28/2017	109.6	93.2
8/29/2017	83.8	34.6
8/30/2017	24.7	5.1
8/31/2017	35.7	6
9/1/2017	83.8	8.1
9/2/2017	144.2	37.2
9/3/2017	155.5	193.5
9/4/2017	185.7	189.1
9/5/2017	145.6	122.7
9/6/2017	73.7	61.7
9/7/2017	63.9	28.6
9/8/2017	15	9.8
9/9/2017	14.5	7.1

Air Quality Summary

In Oregon, the air quality was generally Good until August, not clearing up in most places until mid-September when the rains came. Southwest Oregon, Central Oregon, and the southern Willamette Valley bore the brunt of poor air quality for prolonged periods. Air quality was the worse in Oregon between August 27 and September 8. September 6 was the single worst day with 31 of 39 monitoring sites reporting particulate levels high to enough to rate as Unhealthy or worse. Other widespread poor air quality days were August 28, September 3, and September 5.

In Washington, air quality was also mostly Good until August. In eastern Washington, air quality degraded to Moderate or worse over much of August and September, while in western Washington, air quality remained Good except for two periods in early August and early September. Air quality was worse in central Washington and the Spokane area than in other areas.

Communities near the Canadian border, such as Omak, Twisp, and Winthrop had a number of Unhealthy days, fueled in part by the fires in British Columbia. Air quality across much of northern Washington, both west and east of the Cascades, saw a number of unhealthy air quality days in early to mid-August. In western Washington, the period of worst air quality was in August, likely due primarily to smoke from British Columbia. In eastern Washington, September 5 through 7 were the worst days with every reporting unit experiencing Unhealthy or Very Unhealthy air quality. Hazardous air quality was not measured at any location in Washington.

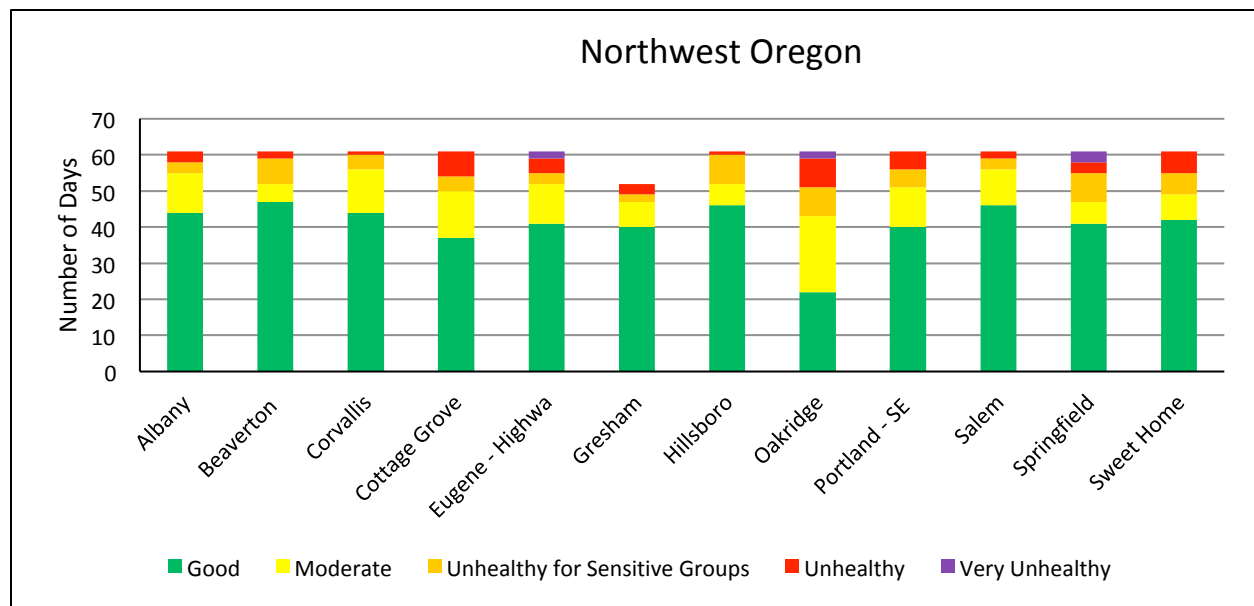
Northwest Oregon

Northwest Oregon suffered from unhealthy air quality from early to mid-August and again in early September. Smoke from four major complexes of fires in the central Cascades was the main culprit in the southern Willamette Valley. Smoke from wildfires in British Columbia reached the northern Willamette Valley in August,

causing degraded air quality at that time. The Eagle Creek Fire in the Columbia River Gorge was responsible for Moderate to Very Unhealthy air quality in early September in Portland and the surrounding area.

Unhealthy air quality occurred over 1-2 days on August 2-3 over much of the Willamette Valley. The worst air quality occurred in the September 1-7 period, reaching Unhealthy and Very Unhealthy levels in much of the Valley, but quickly improving after that. However, September 16 was a day of Moderate to Unhealthy air quality in much of the area as well.

The southern Willamette Valley experienced more smoke than the northern Willamette Valley. Over the August-September period (61 days), approximately 1/3 of the days had Moderate or worse air quality in Cottage Grove, Eugene, Springfield, Oakridge, and Portland. Oakridge had 10 days with air quality rated as Unhealthy or worse, while Cottage Grove, Eugene, Springfield, and Sweet Home experienced 6-7 days with Unhealthy or worse air quality from smoke. In addition, Eugene, Springfield, and Oakridge had at least one day with air quality rated as Very Unhealthy. Oakridge had the fewest number of days with Good air quality in August and September, largely due to nighttime smoke impacts.



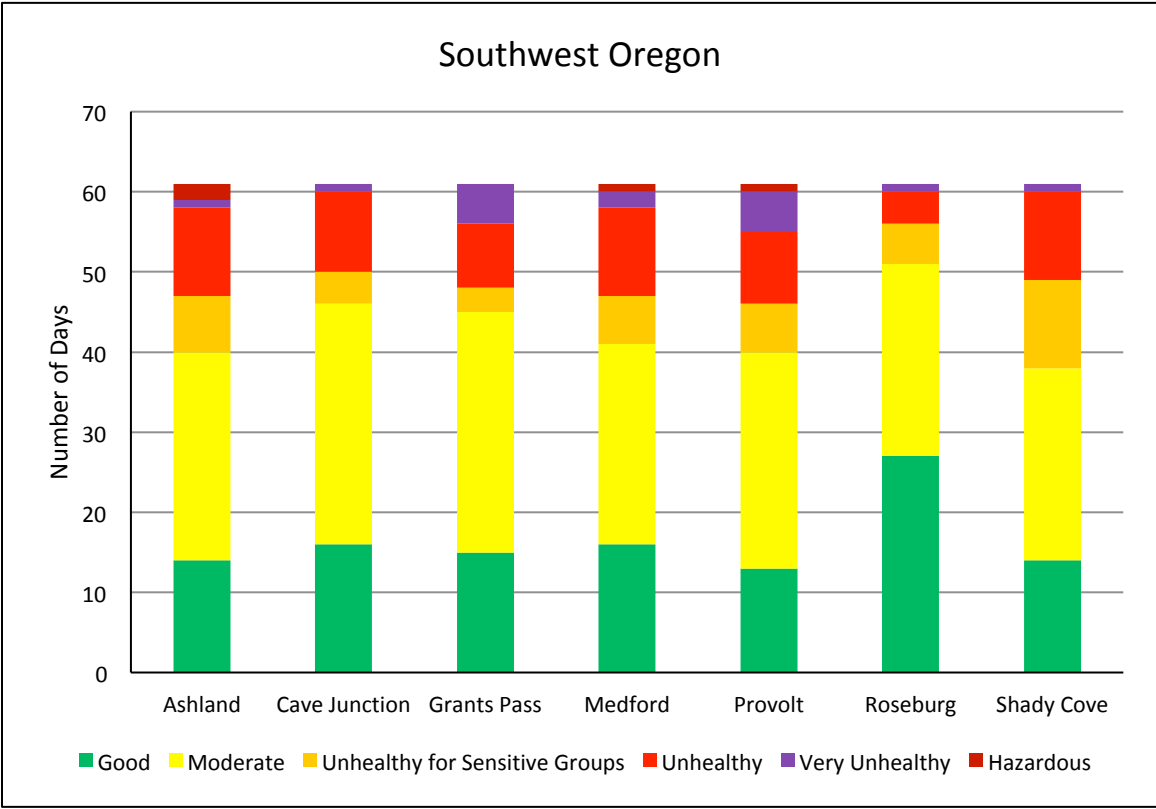
Southwest Oregon

Air quality in Southwest Oregon was degraded for most of the August-September period with the worst air quality occurring from mid-August through mid-September. Air quality was rated Moderate or worse for 45 to 48 days in the Rogue River Valley, depending on location, and for 34 days in the Umpqua River Valley due to particulates from wildfire smoke. Eleven to 15 days reached Unhealthy or worse in the Rogue River Valley, with only five days so rated in the Umpqua River

1 Valley. Ashland, Medford, and Provolt each had at least one day rated as
2 Hazardous, where the air quality was considered dangerous for everyone.

3 The Rogue River Valley was essentially surrounded by wildfires burning in the Coast
4 Range, Cascades, and northern California, along with some fires in the valley itself.
5 Smoke reached the Rogue River Valley from Chetco Bar Fire and from the High
6 Cascades and Miller complexes in Oregon. No matter which way the wind blew in
7 much of August and September, it carried smoke from somewhere into the valley,
8 with both daytime and nighttime smoke contributing to air quality problems.

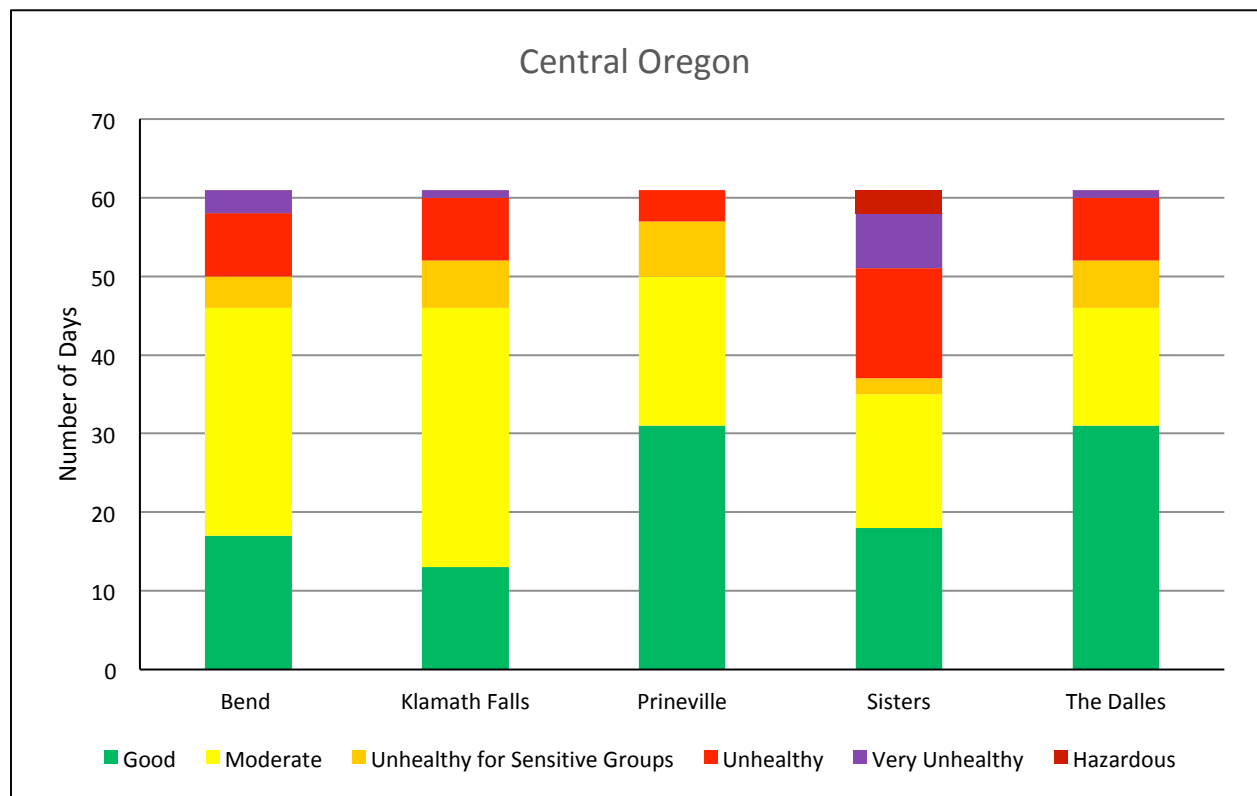
9 Provolt, Grants Pass, and Ashland had the highest number of days rated as
10 Unhealthy to Hazardous, followed by Cave Junction. Surprisingly, the air quality in
11 Medford reached Very Healthy only one day (September 6) and Unhealthy only
12 twice (September 3 and 5). The Umpqua Basin was more fortunate in that most of
13 their smoke came from fires burning in High Cascades and Umpqua North
14 complexes. However, the late August-early September period still resulted in
15 severely degraded air quality in Roseburg with September 3 reaching Very
16 Unhealthy levels and a scattering of days rated Unhealthy before and after that.



Central Oregon

Air quality in Central Oregon (the area from Klamath Falls to The Dalles) followed much the same trend as Southwest Oregon. The entire area experienced Moderate air quality or worse for 30 to 48 days. Air quality deteriorated rapidly beginning in mid-August, especially for Sisters, Bend, and Klamath Falls, lasting until mid-September. Klamath Falls had the fewest number of days rated as Good air quality in the August-September period, but also the most number of days rated as Moderate. Prineville had the best air quality, relatively speaking, reaching no worse than Unhealthy for four days while Sisters had the worst air quality, reaching Hazardous levels on August 20 through 22. Klamath Falls, Bend, and Sisters were adversely affected by both daytime and nighttime smoke.

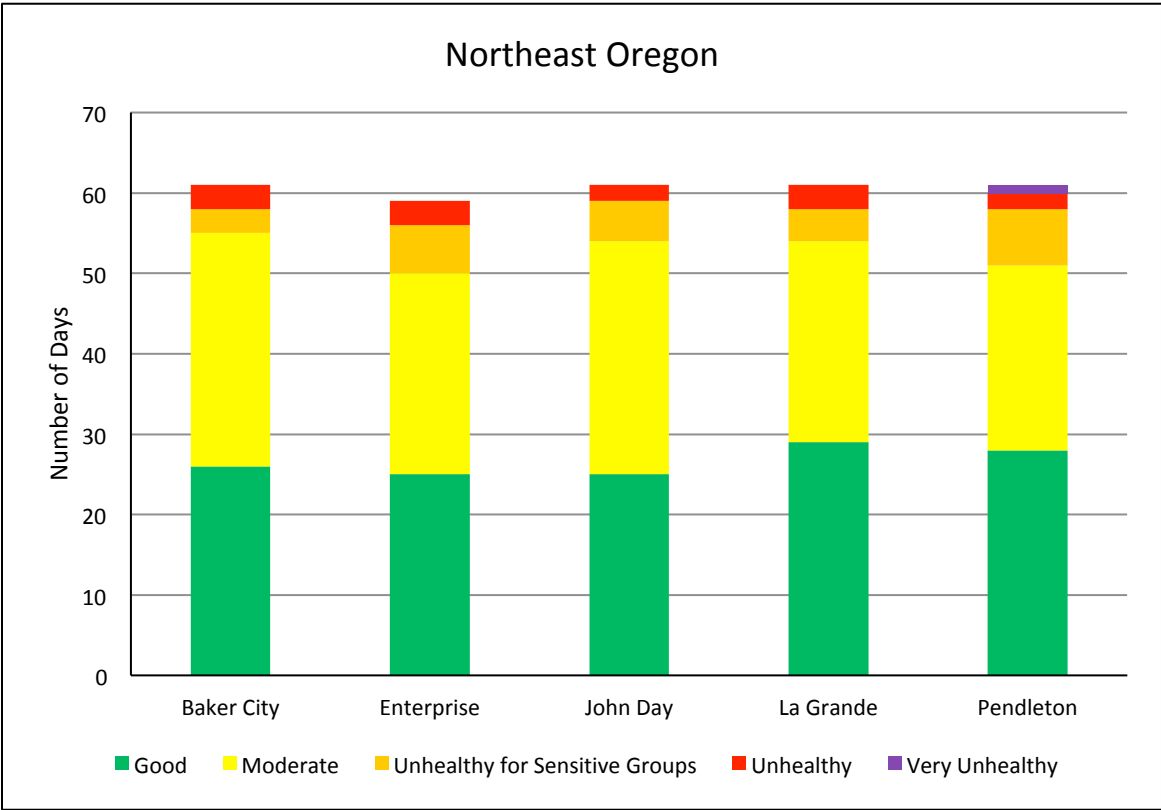
Poor air quality in central Oregon was largely due to large fires and multiple complexes in the central and southern Cascades. Milli Fire and the Horse Creek Complex affected Sisters and Bend while North Pelican sent smoke into Klamath Falls. Air quality in The Dalles was largely affected by the Eagle Creek Fire in early to mid-September, reaching Very Unhealthy levels on September 6 and Unhealthy levels for several days before and after that date.



1 **Northeast Oregon**

2 The general lack of large wildfires in Northeast Oregon kept air quality from
3 degrading severely for prolonged periods. While air quality was rated as Moderate
4 or worse for over a month, much of that time the air quality was Moderate. The
5 number of days rated as Unhealthy or worse ranged from two to three days,
6 concentrated over a four-day period between September 5 through September 8.
7 Only Pendleton reached Very Unhealthy levels and for only one day on September
8 6.

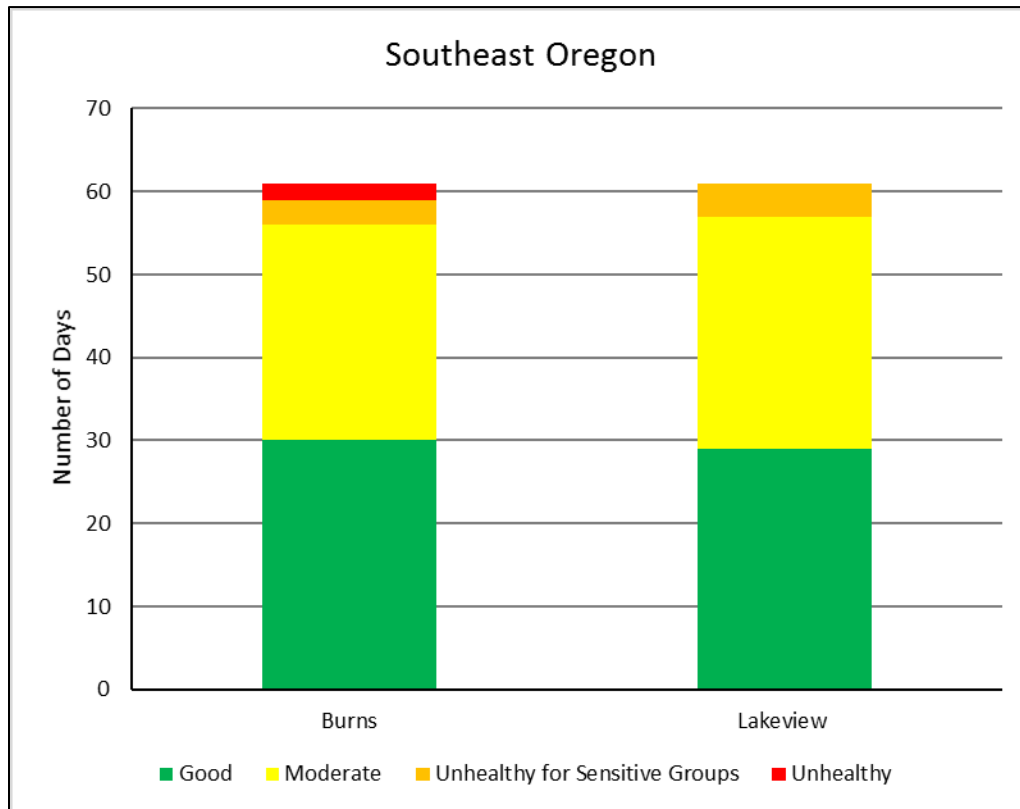
9 Unlike in most years, the Blue Mountains experienced a relatively mild fire season,
10 with few large fires. The most likely sources of the particulates that caused
11 degraded air quality were smaller fires, and occasional smoke from wildfires in
12 British Columbia, although blowing dust may have contributed to the Very
13 Unhealthy day in Pendleton.



16 **Southeast Oregon**

17 As in Northeast Oregon, Southeast Oregon experienced a relatively benign fire
18 season with respect to smoke, with few very large wildfires. Air Quality was Good to

Moderate over most of the August-September period. The worst air quality was two days of Unhealthy air in Burns on September 6 and 7.

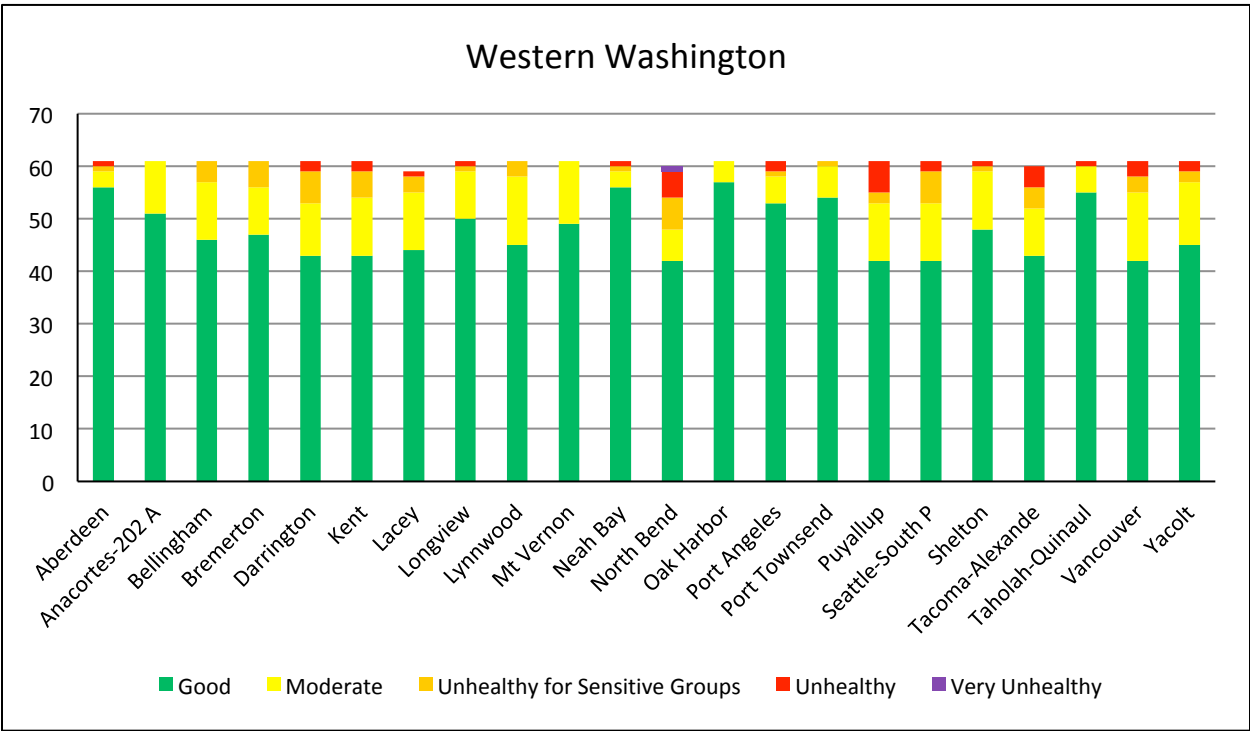


Western Washington

Air quality in Western Washington remained Good for most of the August-September period (41 to 56 of the 61 days). Western Washington experienced two distinct periods of Moderate air quality or worse. The largest period was in early to mid-August. All but one sensor registered Moderate to Unhealthy air quality on August 2 and 3. For a short period between September 5 and 7, most sensors registered enough particulates to classify the air quality as Moderate to Very Unhealthy. Over the two-month period, North Bend had the worst air quality with 12 days rated as Unhealthy for Sensitive Groups or worse and the only location to report Very Unhealthy air quality (September 5). Cheeka Peak, Darrington, Kent, Puyallup, and the Seattle-Tacoma area had seven to eight days of Unhealthy for Sensitive Groups or Unhealthy air quality, mostly in early August.

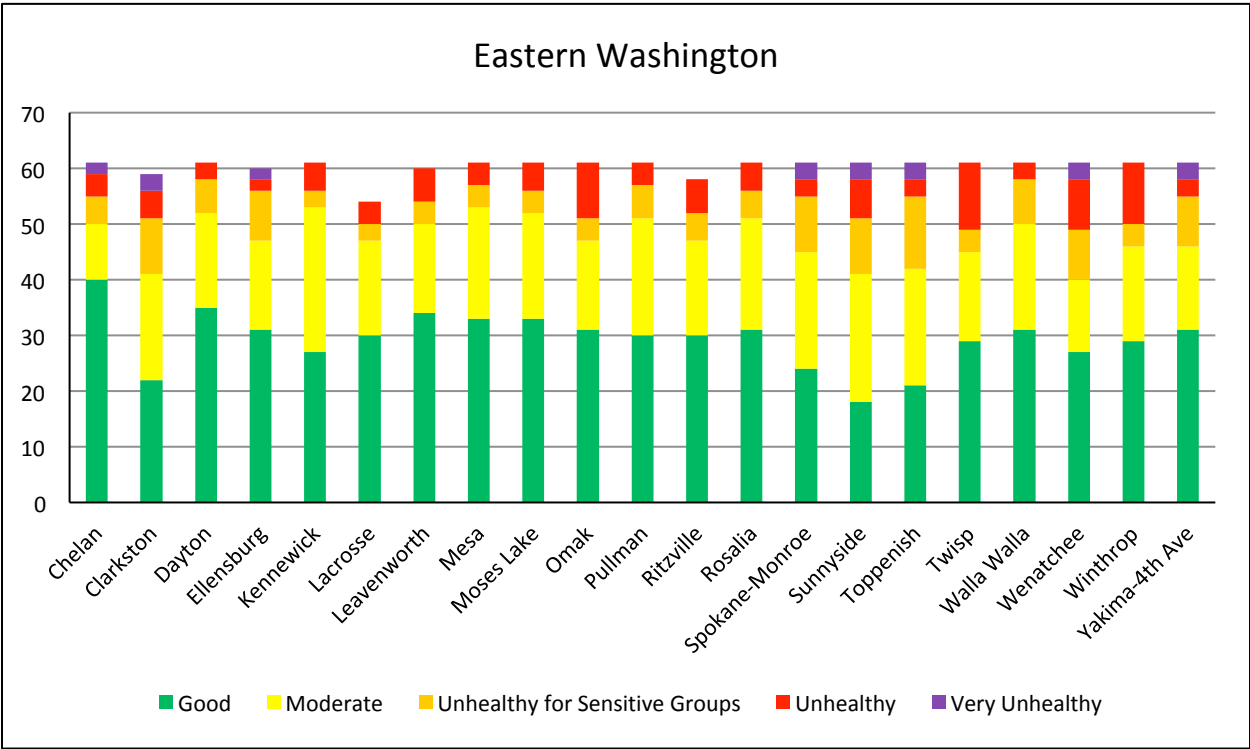
Much of the smoke in August was likely from wildfires in British Columbia. Western Washington experienced a number of smaller fires that likely contributed as well, particularly in the Seattle-Tacoma area. Smoke from wildfires in eastern Washington, such as Norse Peak Fire, also likely affected western Washington to

1 some degree through nighttime smoke. Vancouver was also impacted by the Eagle
2 Creek Fire in early September.



3
4
5 Eastern Washington
6 Air quality in Eastern Washington was much poorer than Western Washington. Air
7 quality was rated as Good for about two weeks from mid- to late-August and after
8 mid-September. Communities with 15 or more days rated as Unhealthy for
9 Sensitive Groups or worse included Clarkston, parts of Spokane, Toppenish, Twisp,
10 Wenatchee, Winthrop, and Yakima. Very Unhealthy air quality occurred in Airway
11 Heights, Chelan, Clarkston, Ellensburg, Spokane, Sunnyside, Toppenish,
12 Wenatchee, and Yakima for two to three days between September 5 and 7.
13 Unhealthy air quality occurred at all other locations in that same period, with the
14 exception of Chelan and Omak on September 5.
15 August 2 through 12 was another period of generally degraded air quality across
16 eastern Washington, with Unhealthy air quality reported for much of the period in
17 Omak, Sunnyside, Twisp, Wenatchee, and Winthrop. Other locations with at least
18 one day rated as Unhealthy over that same period include Airway Heights, Chelan,
19 Clarkston, Kennewick, Leavenworth, Mesa, Moses Lake, Ritzville, Spokane,
20 Toppenish, and Wellpinit.

1 Smoke during the first half of August was likely a combination of smoke from
2 wildfires in British Columbia and from local wildfires. For example, smoke from the
3 Jolly Mountain and Norse Peak fires affected Yakima and the surrounding area,
4 while Diamond Creek Fire affected the air quality in the Methow Valley. In contrast,
5 smoke and degraded air quality in September was most likely from local wildfires,
6 particularly in the Cascades. Poor air quality in Clarkston may also have been due
7 to nighttime smoke from wildfires in western Montana and central Idaho that was
8 funneled down the Clearwater River basin.



9

10

11

- 1 Appendix E: August Total Eclipse
- 2 Appendix F: Southwest Oregon
- 3 Chetco Bar
- 4 Miller Complex
- 5 High Cascades

Appendix G: Central Cascades (Umpqua, Willamette, and Deschutes
National Forests, Roseburg BLM)

Sheep Springs

Date of Ignition	June 26, 2017
Cause	Lightning
Land Status at Fire Origin	Deschutes National Forest
Preparedness Level at Time of Ignition	National: PL 2 Regional: PL 2
Fire Size	696 acres
Estimated Cost	\$780,000
Land Jurisdictions Affected	National Forest
Maximum Resources Assigned	180 Personnel 7 Crews 11 Engines 2 Water Tenders 1 Helicopter 2 Heavy Equipment
Structures Destroyed	0
Cooperators	Forest Service, Oregon Department of Forestry

June 26-27

The Sheep Springs Fire started from a lightning strike in the early morning of June 26. The fire ignited in an area with abundant snags that had burned in the 2003 B&B Complex. An Oregon Department of Forestry engine responded on June 27 and recommended using an indirect attack strategy due to the number of snags, the hot and dry conditions, and increasing winds. Firefighters began preparing an indirect fireline for use in burn out operations to contain the fire.

June 28-29

A Type 3 incident management team assumed operational control of the fire on June 28. The fire grew over this two-day period from 10 acres to an estimated 20 acres, spreading slowly but steadily in the B&B fire scar. Smoke impacts in the

Metolius Basin reminded locals of the B&B Complex, making the rapport with the community a management concern along with public and firefighter safety.

June 30

Current and planned burn out operations increased the fire size to an estimated 750 acres, although the burn out operations were not yet complete. The fire rated as 50 percent contained due to the combination of completed fireline, level of completed burn out, and the continued slow spread of the main fire. Mop-up began on parts of the burn out area to make sure the fire would not spread beyond the established control lines.

July 1-2

Better mapping reduced the fire size to 696 acres. Burn out operations were completed by July 2, and mop-up and patrolling began to ensure the fire stayed within the established perimeter. Spotting concerns across the firelines were a possibility from burning snags near the fireline.

July 3-5 and beyond

Management of the fire was transferred back to the Ranger District on the morning of July 3 and most of the crews and engines sent back to their home units. Mop-up of remaining hot-spots along the perimeter and patrolling of the firelines continued for some time after July 5 before the fire was considered fully contained. Mop-up did not occur in the fire interior due to the safety threat of all the snags. As a result, the fire was checked regularly until the District was certain that it would not spread beyond the control lines. The estimated full containment date was July 31, although effectively occurred earlier than that date.

Significance

Oregon Department of Forestry has a reputation for very aggressive tactics on wildfires with a preference for direct attack strategies and tactics. Since an Oregon Department of Forestry engine was first on the scene, the engine captain was the initial incident commander. However, that person readily recognized the high safety risks posed by the number of snags in the fire area and initiated an indirect attack strategy to contain the fire.

Horse Prairie

Date of Ignition	August 26, 2017
Cause	Human
Land Status at Fire Origin	Private
Preparedness Level	National: PL 5

at Time of Ignition	Regional: PL 5
Fire Size	16,436 acres
Estimated Cost	\$16,300,000
Land Jurisdictions Affected	Private, BLM
Maximum Resources Assigned	1,099 Personnel 49 Crews 39 Engines 27 Water Tenders 8 Helicopters 13 Heavy Equipment
Structures Destroyed	2
Cooperators	Bureau of Land Management, Forest Service, Cow Creek Tribe, Oregon Department of Forestry, Oregon National Guard, Oregon State Fire Marshall, Douglas County Sheriff, Tenmile Fire Department, Camas Valley Fire Department, Riddle Fire Department, Douglas Fire Protective Association, Local Timber Companies

August 26

The Horse Prairie Fire started mid-afternoon on private lands under severe burning conditions – hot, dry, and with an unstable atmosphere. The fire exhibited extreme behavior almost from the moment of ignition, with tree torching, crowning runs, and rapid spread in the understory. Smoke affected residents along Highway 42 and Olalla Road immediately. The area of the fire start was a checkerboard of private timberlands and BLM-managed lands with commercial timber and late successional reserves. The initial responders included Oregon Department of Forestry, BLM, Tenmile Fire Department, Camas Valley Fire Department, and local timber companies. The fire grew to an estimated 425 acres in less than 12 hours.

August 27-September 1

Morning inversions dampened fire spread in the mornings and also hampered air operations. Once the inversions lifted around midday or mid-afternoon, fire behavior picked up and the fire made significant runs, burning in recently felled timber, young Douglas-fir plantations, and older Douglas-fir forests on both private and public lands. It quickly began moving into steeper, more rugged terrain, contributing to control difficulties and prompting the use of indirect suppression tactics. Rapid spread and the values at risk resulted in rating Horse Prairie as a high

1 priority fire. However, severe regional and national resource shortages made it
2 difficult for the team to receive the resources requested.

3 Smoke from the fire affected residents along Highway 42 and Olalla Road as well as
4 Roseburg and Winston. On August 28, the Douglas County Sheriff's Office issued
5 Level 2 evacuation orders for the area from the junction of Doe Creek Road and
6 Cow Creek Road to the junction of Union Creek and Cow Creek Road. On August
7 29, the fire spotted across Cow Creek resulting in the Sheriff's Office issuing Level 3
8 evacuation orders for Cow Creek Road between Union Creek-Cow Creek junction
9 and Glenbrook Road. Roads on both public and private lands in and around the fire
10 were closed to public use as a safety precaution. Crews from the Oregon National
11 Guard also joined the firefighting efforts on August 29. By August 30, the fire was
12 moving into ponderosa pine stands. On the positive side, control lines on the north
13 and northwest sides of the fire were holding and crews made good progress on line
14 construction on the northeast side of the fire.

15 The fire was estimated at 11,500 acres on August 31 with 39 crews and 34 engines
16 assigned to the fire. While the fire size continued to increase, much of that increase
17 was now due to burn out operations on the western side of the fire that tied the
18 fireline into Cow Creek. Mop-up progressed on the northwest, north, and northeast
19 sides and beginning on the western side. A wind shift helped to push smoke away
20 from nearby communities, providing some relief. By September 1, fire spread was
21 slowing as firefighters gained the upper hand. All established lines continued to
22 hold. Structure protection efforts around the residences on Cow Creek continued.
23 Crews began preparing contingency lines in case the forecast warming and drying
24 conditions caused the fire to spot across control lines. The incident management
25 team moved the incident base camp to a new location near Riddle.

26 **September 2-8**

27 Containment of the Horse Prairie Fire grew steadily through the period. By
28 September 2, the fire had 49 crews and 39 engines assigned to it. The homes along
29 Cow Creek Road were considered secure and mop-up continued on the cooler parts
30 of the fire. Inversions, smoke, and excessive heat remained on-going problems,
31 however. On September 3, the fire made downhill runs under north winds and
32 smoke reduced visibility along Cow Creek Road to as little as 50 feet. Security at
33 road closures increased due to the Labor Day holiday. On September 5, the high
34 pressure system that had been affecting the fire began to break down, bringing
35 more unstable conditions, shifting and gusty winds, and an increased risk of erratic
36 fire behavior. Fire behavior was very active over the next two days with downhill
37 runs, crowning, and spotting up to ½ mile. All resources focused on mopping up,
38 gridding for spot fires, and felling all snags within 300 feet of the control lines.
39 September 7 was the first day the fire did not increase in size as some rain fell with
40 more expected. The Douglas Sheriff's Office reduced the evacuation orders for Cow

Creek Road to Level 1 as a result. On September 8, additional rain, cooler temperatures and higher relative humidity aided containment efforts.

September 9-24

Containment of the fire increased every day through the period, reaching 95 percent by September 18, and steady demobilization of firefighting resources began. The team used an unmanned aircraft system equipped with an infrared camera as well as handheld infrared cameras to locate hot spots. The Central Oregon Railroad line reopened on September 10. The team held a community meeting on September 12 at the Riddle Community Hall to discuss the fire and a legislative tour of the fire on September 14. The temporary bridge over Cow Creek was removed on September 13. A dry cold front moved over the fire on September 13, bringing gusty winds, and more seasonable temperatures and relative humidity. Command of the fire was transferred to a local type 3 incident commander on September 15. Of the 16,436 acres within the fire perimeter, 7,626 acres were managed by Roseburg BLM and 8,810 acres were managed by private timber companies.

Significance

Even though Horse Prairie was a relative small fire, the values at risk, especially private commercial timberlands, made this fire a high priority in the Northwest. As a result, this fire had as many crews and nearly as many engines assigned to it as the much larger Chetco Bar Fire.

Whitewater

Date of origin	July 23, 2017
Cause	Lightning
Ownership	Willamette National Forest
PL at ignition	National: PL 4 Regional: PL 3
Size	11,493 Whitewater Fire 14,451 complex total
Cost	\$39,702,783.00
Jurisdictions	Forest Service
Maximum Resources Assigned	827 Total personnel 24 Crews 30 Engines

	17 Water Tenders 5 Helicopters 19 Heavy Equipment
Structures destroyed	0
Cooperators	Forest Service, Bureau of Indian Affairs, Bureau of Land Management, National Park Service, Marion County Emergency Management, Oregon Department of Forestry, Linn County Sheriff, Marion County Sheriff, Washington State Department of Natural Resources

1

2 Whitewater Fire was reported on July 23, and attributed to a holdover from a
3 lightning strike about a month earlier. The fire was located in Mount Jefferson
4 Wilderness, approximately three miles up the Whitewater Creek Trail, 20 miles east
5 of Detroit, Oregon. A local Type 3 Team took charge of the 50-acre fire July 25.

6 Early efforts focused on full suppression with a light touch. The fire was burning
7 inside the wilderness boundary and presented limited risk to private property and
8 timber values. Located about four miles from the Whitewater Creek Trailhead, the
9 fire was in a popular launching point for hikers into the wilderness area. Early on,
10 local crews hiked 3 miles into the wilderness to begin suppression efforts and by
11 July 26, the fire was estimated at 15% contained. Hand crews built fireline and
12 helicopters dropped water to prevent the fire's spread. Fire managers also used
13 helicopters to fly in five pumps and thousands of feet of hose to get water to
14 strengthen existing handlines. By July 27, over 85% of the fire had handline around
15 the 80-acre fire, and the remaining 15% was located on inaccessible rocky cliff
16 bands.

17 On July 28, fire managers began to develop large scale contingency plans, including
18 ordering heavy equipment to work on fuel reduction around the road systems next
19 to Whitewater Creek outside of the Mount Jefferson Wilderness. At this time,
20 Willamette forest managers ordered a Type-2 team based on forecasts for hotter,
21 drier conditions, and an incident base camp was established at Hoodoo Ski Area. At
22 this time, the fire was at 89 acres in size.

23 On July 31, the Type 2 team took command of the fire and the Willamette Forest
24 Supervisor closed all trail access points into Jefferson Park inside the Mt. Jefferson
25 Wilderness, including 11 miles of the Pacific Crest Trail. On August 1, the weather
26 forecast was for very hot, dry and unstable conditions to the fire area for several
27 days. The fire grew to 1,500 acres overnight, crossing out of the Mount Jefferson

1 Wilderness near the Whitewater Trail and threatening 100 residences and 150 other
2 structures. Rapid spread continued on August 2 to the west with the fire reaching
3 an estimated 4,579 acres.

4 On August 3, a heavy smoke inversion tempered fire behavior and grounded
5 aircraft due to low visibility. Dense smoke continued to cause problems for fire
6 operations as well as affecting air quality in central Oregon generally on both sides
7 of the Cascade crest. By August 5, the closure expanded to almost half of the
8 Mount Jefferson Wilderness and 28 miles of the Pacific Crest Trail. On August 7, the
9 area closure was expanded yet again to include 117,000 acres in the Mount
10 Jefferson area. Crews used indirect tactics, constructing fireline away from the main
11 fire and burning out to protect the identified values at risk from the fire.

12 August 10 brought thunderstorms to the fire area late in the day in the fire area.
13 Two small lightning-caused fires the storms were discovered on August 11
14 approximately three miles southeast of the Breitenbush Community on Devil's
15 Ridge in steep terrain. Aircraft were used to keep those fires in check. Crews
16 constructed fireline around the smaller of the two fires on August 12, but the larger
17 fire was in inaccessible, rocky terrain. For the next several days, crews continued to
18 construct indirect line, burn it out, and hold it and supported initial attack
19 operations on new starts in the Whitewater fire area. Light rain on August 13 aided
20 firefighting efforts for a brief period, but unseasonably hot and dry conditions
21 quickly returned. By mid-month, national and regional demand for firefighting
22 resources was extremely high. On August 15, a Type 1 incident management team
23 took over management of the fire and supported the Little Devil, French, Rebel,
24 Avenue, and Box Canyon fires as well.

25 On August 21, during the eclipse, fire behavior decreased dramatically during as
26 temperatures dropped and relative humidity increased. On August 22, the team
27 added Ollalie, Pete, Separation, and Roney fires to their responsibilities. East winds
28 caused these fires to grow rapidly. On August 23, Horse Creek Complex was
29 established to include Avenue Fire and Olallie, Separation, Roney fires. Due to the
30 unavailability of additional incident management teams, the team for Whitewater
31 and Little Devil also managed the Horse Creek Complex.

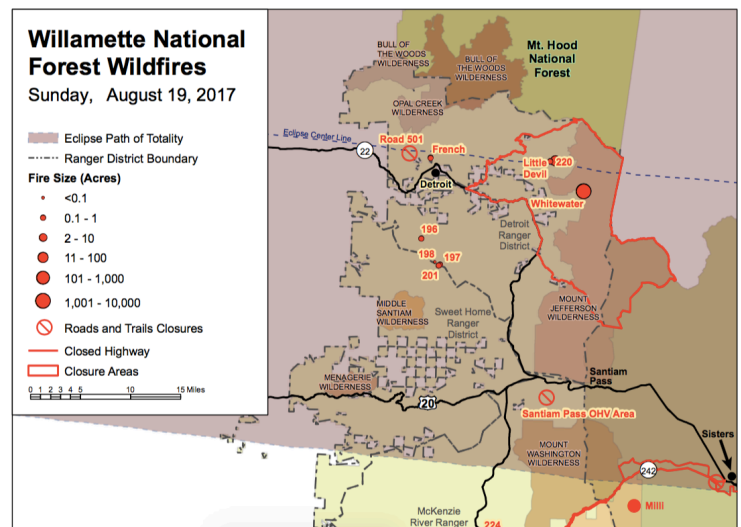
32 On August 27, a new Type 1 incident management team assumed command of
33 Whitewater, Little Devil, and Rebel fires and the Horse Creek Complex. A red flag
34 warning was in place on August 28 had for dry and unstable conditions and on that
35 day, Scorpio Fire was detected at 30 acres north of Breitenbush. Potato Hill Fire
36 was discovered at 50 acres on August 29. Crews continued to employ indirect
37 tactics, but using direct attack when burning conditions and fire behavior permitted.
38 Dense smoke hampered firefighting efforts on many days and affected air quality in
39 communities to the west.

On September 19 the entire area saw heavy rain and mixed snow, effectively halting fire spread. Firefighting efforts then transitioned to suppression repair and retrieval of equipment. A local Type 3 team assumed management of the complex on September 27.

Significance

Whitewater Fire ignited in an area located within the 2017 solar eclipse path of totality. The fire would trigger an extensive area closure in a large stretch of public lands in a prime viewing location for hundreds of thousands of visitors. The smoke from Whitewater Fire along with multiple fires burning in the region at the same time would impact the quality of life of many people, and the recreation of thousands of visitors, and would impact the local economy in communities near Detroit Ranger District.

Although the number of structures threatened were far less than in other large fires in the region, the effects from the smoke, the impaired visibility, and the extensive area closure had a notable impact to many people this year in particular. A 1000-person hike to Mt. Jefferson to view the solar ellipse was cancelled, almost 28 miles of Pacific Crest Trail were closed, and an untold amount of people planning to camp or hike during the eclipse had to change their plans. This brought higher numbers of people towards coastal forests and towards central and eastern Oregon.



Umpqua North Complex

Date of Ignition	August 11, 2017
Cause	Lightning
Land Status at Fire	Umpqua National Forest

Origin	
Preparedness Level at Time of Ignition	National: PL 5 Regional: PL 5
Fire Size	Brokentoath -3,941 acres Fall Creek - 4,827 acres Oak Knob - 59 acres Happy Dog - 31,141 acres Devil - 874 acres Copeland - 699 acres Rattlesnake - 1,373 acres #320 - 115 acres 4 other fires - 3 acres
Estimated Cost	\$42,890,561
Land Jurisdictions Affected	Forest Service, BLM, Private
Maximum Resources Assigned	1157 Personnel 29 Crews 84 Engines 27 Water Tenders 5 Helicopter 28 Heavy Equipment
Structures Destroyed	1
Cooperators	Forest Service, Bureau of Land Management, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Park Service, National Weather Service, Oregon Department of Forestry, Oregon Department of Transportation, Douglas County Sheriff, Douglas Forest Protective Association, PacifiCorp Energy, American Red Cross, Glide School District, Cow Creek Band of the Umpqua Tribe, U.S. Army

1

2 **August 11-13**

3 Lightning started several fires on the North Umpqua Ranger District and began

4 spreading rapidly under hot, dry, and windy conditions. The Forest Supervisor

5 ordered a Type 1 team to manage the fires as a complex given the increasing

6 scarcity of firefighting resources and the number of new starts across the region. A

1 Type 1 team from Alaska was assigned to the complex of approximately 34 fires
2 and given initial attack responsibility over 183,919 acres of the North Umpqua
3 Ranger District on August 13. Several campgrounds were evacuated along Highway
4 138 and trailheads closed. The fires threatened the community of Dry Creek.

5 **August 14-20**

6 Fall Creek, Happy Dog, and Ragged Ridge fires quickly emerged as the main threats
7 and the focus of much of the firefighting effort. The Douglas County Sheriff's Office
8 issued Level 3 evacuation orders for the Dry Creek community, resulting in the
9 evacuation of 50 people, and Level 2 evacuation orders for Moore Hill Lane. Other
10 values at risk included transmission and distribution lines, commerce and tourism
11 on the Umpqua River, cultural and heritage resources, threatened and endangered
12 species habitat for northern spotted owl and salmon, and recreation facilities such
13 as trailheads and campgrounds.

14 Morning inversions with dense smoke hampered air operations on most days, but
15 also dampened fire behavior until lifting around mid-afternoon. Once the inversions
16 lifted, fire activity increased with fires spreading via spotting and rolling material.
17 The fires remained active well into the night. Steep terrain created multiple
18 concerns over access to existing and any new starts and firefighter safety given the
19 number of fires included in the complex, the extent of rolling material, and limited
20 escape routes and safety zones.

21 Happy Dog Fire burned 13 power poles on August 13 and begin burning through the
22 Dry Creek community. A structure protection group was in place to protect the
23 homes with both day and night shifts. On August 18, Happy Dog spotted across the
24 North Umpqua River, soon posing threats to the Clearwater area and Steamboat as
25 well as hampering access to the Calf Copeland cluster of fires. Fall Creek Fire
26 spread primarily south and west, threatening to cross the National Forest boundary
27 onto a checkerboard of BLM-managed lands and private lands. Several fires began
28 merging together, such as Happy Dog and fires 396 and 397, as well as the cluster
29 of fires around Brokentooh and Devil's Canyon.

30 The team held a community meeting in Glide on August 15 to provide an update on
31 the fires and firefighting efforts and to answer questions. Several campgrounds,
32 trails, and recreation sites were closed. The Sheriff's Office and Oregon State
33 Marine Board closed the North Umpqua River between Boulder Creek and Susan
34 Creek.

35 On August 16, the Sheriff's Office initially lowered the evacuation level for Dry
36 Creek to 2, but a rapid increase in fire behavior later in the afternoon, resulting in
37 re-imposing Level 3 evacuation orders and expanding the area of coverage to
38 include the Illahee area. By August 18, the Sheriff's Office issued Level 1
39 evacuation orders for the Susan Creek residential area and for the Clearwater area

1 on August 20 due to spotting and spot fire spread from Happy Dog and Fall Creek
2 fires.

3 Rolling material onto the road promoted Oregon Department of Transportation to
4 close the road shoulders and pullouts along Highway 138 between mileposts 31 to
5 35 and 45 to 50.5 and later to close the highway between mileposts 39 to 54 and
6 use pilot cars to escort vehicles through the closure area. PacifiCorp deenergized
7 the powerlines in the area as well.

8 **August 21-27**

9 Both Happy Dog and Fall Creek fires continued to move both east and west along
10 Highway 138, threatening additional miles of highway corridor, transmission lines,
11 and a hydroelectric power plant site. Ragged Ridge Fire was threatening an
12 alternative confinement line to the north. The structure protection group was now
13 also working several miles ahead of the fires developing protection plans for
14 individual homes and structures. On August 21 and 22, Oregon Department of
15 Transportation closed Highway 38 between mileposts 50 and 51 to all traffic,
16 including firefighter traffic, due to dense smoke and debris falling on the highway,
17 later expanding the closure to all but firefighting traffic between mileposts 43 and
18 54. The team held a community meeting in Glide on August 22 and in Tokatee on
19 August 23 to update people on the status of the fires and answer questions.
20 Although crews continued to make some progress on Fall Creek, Ragged Ridge, and
21 Happy Dog fires, terrain and falling debris continued to limit firefighting efforts,
22 especially in Devil's Canyon. Moderating weather aided firefighting efforts, allowing
23 firefighters to conduct some burning out operations to strengthen containment
24 lines, especially on Fall Creek and Ragged Ridge fires. Firing operations were also
25 used to help protect the PacifiCorp transmission lines, residences at Soda Springs
26 and Slide Creek, the Fish Creek Power Plant, and Toketee Ranger Station. On
27 August 26, the team established a 200-person camp east of the closure area on
28 Highway 138 to facilitate firefighting efforts. Crews developed contingency lines by
29 reopening roads, brushing out roads, and reestablishing old dozer lines used in
30 previous fires.

31 By August 27, conditions became hotter and drier and fire activity increased. Happy
32 Dog Fire spotted across Forest Road 28; the spot fire quickly grew to 30 acres.
33 Mudd 2 and Brokentooh fires also crossed Forest Road 28 and spread rapidly to the
34 southeast. Four new fires, likely holdover fires from the lightning event two weeks
35 prior that started the complex, popped up as well. An infrared flight on August 27
36 mapped 18,073 acres within the complex and revealed that Happy Dog and Ragged
37 Ridge fires had joined north of Highway 138.

August 28-September 3

Severe burning conditions led to the widespread use of indirect suppression tactics such as construction of containment lines away from the fire edges followed by burning out and the construction of contingency lines in case the main containment lines did not hold. Spot fires, inversions, thermal trough passages, and dense smoke remained problematic throughout the week. By August 29, Happy Dog Fire began burning into other recent fire scars and crews worked to keep the fire from emerging from those burn scars. The Sheriff's Office reduced the evacuation notice to Level 2 in the Dry Creek and Illahee areas and Highway 138 was reopened between mileposts 43 and 47, allowing those residents to return home on August 29.

The team held community meetings in Glide on August 30 and Tokatee Ranger Station on September 1. The Alaska Type 1 team transferred command of the complex to a California Type 1 team on September 1. The Sheriff's Office also increased the evacuation order to Level 2 in the Slide Creek area on September 1. On September 2, the team used an unmanned aerial system to scout Rattlesnake Fire in the Rogue-Umpqua Divide Wilderness to assist in developing a management strategy for this fire and established a secondary fire camp at Diamond Lake to reduce drive times for firefighters.

September 4-10

Firing operations continued to contain the active fires in the complex. For example, crews burned out along Forest roads to tie Happy Dog and Brokentooh fires together since these fires seemed inclined to burn together anyway, and to keep Happy Dog Fire from burning additional areas along Highway 138. Air quality conditions prompted Oregon Department of Environmental Quality to issue an air quality alert for the area in and around the complex on September 4. Dense smoke continue to affect both the fire behavior and the ability to use helicopter bucket drops until the end of the week.

On September 4, the Sheriff's Office lifted the Level 1 evacuation orders for Moore Hill Lane and Susan Creek area. Firefighters secured the Illahee area, allowing PacifiCorp to reenergize the transmission line. By September 7, cooler, moister conditions and some rain moved over the complex area, allowing firefighters to begin using direct attack tactics on portions of Happy Dog and Ragged Ridge fires. Oregon Department of Transportation reopened all of Highway 138 with pilot cars operating between mileposts 47 and 54. Rain fell on the complex on September 8 but also brought an estimated 186 lightning strikes in Douglas County. The team used an unmanned aerial system to scout southern boundary of Happy Dog Fire and Brokentooh Fire for access and to assess fire behavior. Suppression action was taken to check Rattlesnake Fire as it moved out of the wilderness with additional actions planned when firefighting resources are available.

1 On September 9, Soldiers of Task Force Spearhead, 1-2 Stryker Brigade Combat
2 Team, 7th Infantry Division, Joint Base Lewis-McChord, Washington, completed
3 their first day of training on the fireline. The following day, they began working on
4 the Devil, Brokentooh and Ragged Ridge fires. Additional rain on the 9th aided
5 suppression efforts. Fall Creek Fire was contained on September 10.

6 **September 11-17**

7 The team held a public meeting in Roseburg at the Umpqua National Forest
8 headquarters on September 11. Crews began making significant progress in
9 containing the more active fires across the complex. Dense smoke returned on
10 September 12 as conditions dried and fire activity began to pick up. However, direct
11 attack tactics became more viable across more and more of the complex as days
12 shortened and more seasonable temperatures and relative humidity resumed. The
13 main weather concerns changed to cold front passages.

14 Holding, mop-up, and suppression repair operations continued on inactive fires and
15 less active portions of the main fires. Some rain fell on the Devil Fire on September
16 12 and scattered areas of the complex on September 13. Fire activity overall
17 declined as fires or portions of fire moved into the mop-up phase and scattered rain
18 and cloud cover kept temperatures lower and relative humidity higher. By
19 September 13, the complex was an estimated 40,343 acres in size with Happy Dog
20 the largest fire. The Umpqua National Forest reduced the extent of the area closure
21 in the Cougar Bluffs area and reopened Fall Creek Trail on September 13.

22 A holdover fire in the Devil's Canyon area popped up on September 16 and was
23 quickly suppressed. Holding, mop-up, and patrolling continued on all fires, although
24 increased fire activity was noted in the Eagle Rock area just north of Highway 138.
25 Crews focused their efforts on the east side of the Happy Dog Fire, the west flank of
26 the Brokentooh Fire, the north end of the Ragged Ridge Fire and the Highway 138
27 corridor. The California Type 1 team transferred command of the complex to a
28 Great Basin Type 2 team on September 16 and the incident base camp was moved
29 from Glide to the Diamond Lake area.

30 **September 18-October**

31 As much as 3 inches of rain and snow fell on the complex on September 18 and 19,
32 allowing the firefighting efforts to switch to mop-up, patrol, suppression repair, and
33 backhaul of all the equipment out on the firelines. Public use restrictions were lifted
34 on September 19 and Highway 138 fully opened on September 20. By September
35 22, the Umpqua National Forest began reducing area, trail and road closures
36 although some roads, trails, and campgrounds would remain closed until next
37 spring. September 24 was the last day on the fireline for the soldiers of Task Force
38 Spearhead, 7th Infantry Division, 23rd Brigade Engineering Battalion who handled
39 multiple fire suppression and repair assignments on not only the Umpqua North

1 Complex but also High Cascades Complex and Elephant Fire. Fallers worked with
2 Oregon Department of Transportation to remove hazard trees along Highway 138
3 by September 25, which also resulted in resumption of pilot cars during falling
4 operations.

5

Appendix H: Southeast Oregon (Burns, Lakeview, Prineville, and Vale BLM)

Introduction

Protection of habitat for the greater sage-grouse is a top priority for wildfire response in southeastern Oregon. Both the approved resource management plan amendments for sage-grouse (sage-grouse amendments) and the 2015 Integrated Rangeland Fire Management Strategy lay out principles and management direction for reducing the impacts of wildfire on sagebrush ecosystems. Sage-grouse and several other species, such as pygmy rabbit and pronghorn antelope, in these plant communities are dependent on sagebrush for food and cover. Most sagebrush species do not resprout and often require several decades to return to useful habitat. Like northern spotted owls and marbled murrelets, sage-grouse essentially depend on a type of old-growth that requires long recovery times. The sage-grouse “old growth” is a shrub, instead of a tree.

Land use plan amendment specific to greater sage-grouse and the Integrated Rangeland Fire Management Strategy cover the four eastern Oregon BLM Districts (Burns, Lakeview, Prineville, and Vale). The 2016 sage-grouse amendments identified three different types of habitat areas, based on the State of Oregon’s sage-grouse management strategy. Sagebrush Focal Areas (SFAs) have the highest value for maintaining sage-grouse and sagebrush habitat and are considered the most intact and contiguous habitat remaining. Priority Habitat Management Areas (PHMA) contains the habitat used by 90 percent of sage-grouse for breeding and brood-rearing; in southern Oregon along the Nevada and Idaho borders, SFA overlaps with PHMA. General Habitat Management Areas (GHMA) largely connects the patches of PHMA. All of Oregon’s PHMA also has been designated as Priority Areas for Conservation, or PACs, with 20 PACs identified throughout southeastern Oregon. These PACs are the highest priority for wildfire protection.

However, eastern Oregon is large country with few people and a limited number of state and federal firefighting resources. As such their ability to provide rapid response to new fires is also limited. To make up for this lack, BLM and Oregon Department of Forestry have been promoting the formation of Rangeland Fire Protection Associations (RFPAs). These RFPAs have proven to be valuable assets in protecting sage-grouse habitat.

The RFPAs are well trained and well equipped to fight wildland fires. They receive equipment, much of it military surplus vehicles, through Oregon Department of Forestry and via grants from county, state, or federal partners. As a result, RFPAs have engines, water tenders, dozers, and lowboys for transporting heavy equipment. Grants also help the RFPAs purchase radios and personal protective equipment (PPE), such as fire shirts, hardhats, and fire shelters. Both ODF and BLM provide training and additional PPE. Members of an RFPA are able to take on all the

suppression tasks, such as line construction and burn out operations, that federal and state firefighters do.

Oregon Department of Forestry provides oversight and guidance to the RFPAs, but each RFPA is an independent entity. In 2017, Oregon had 22 RFPAs located across much of eastern Oregon (Table y). Nineteen RFPAs responded to wildfires on BLM-managed lands in 2017. Jordan Valley RFPA had the most responses, followed by Post/Paulina and Brothers/Hampton RFPAs. All told, RFPAs responded to 85 wildfires that wound up burning 96,539 acres.

Table y. Locations of RFPAs, number of fires in 2017 they responded to, the total acres associated with those fires.

BLM District	RFPAs	Total Responses	Total Acres
Burns	Crane FG Fields/Andrews Lone Pine Silver Creek Wagontire	18	58,582.4
Lakeview	Warner Valley	5	1
Prineville	Ashwood Brothers/Hampton Gateway Post/Paulina Twickenham	38	5,388
Vale	Blue Mountain Burnt River Ironside Jordan Valley Lookout/Glasgow Vale	28	32,568.5

The following three fires illustrate how wildfires affected important sage-grouse habitat as well as other resource values and the roles that local RFPAs and rural fire departments played in handling those fires.

Ana Fire

Date of Ignition	July 9, 2017
Cause	Human
Land Status at Fire Origin	Private
Preparedness Level	National: PL 3

at Time of Ignition	Regional: PL 2
Fire Size	5,874 acres
Estimated Cost	\$2,900,000
Land Jurisdictions Affected	Private, BLM, National Forest, State
Maximum Resources Assigned	405 Personnel 11 Crews 32 Engines 9 Water Tenders 3 Helicopters 4 Heavy Equipment
Structures Destroyed	2
Cooperators	Bureau of Land Management, Forest Service, Oregon Department of Forestry, Oregon Department of Transportation, Oregon State Police, Surprise Valley Electric, Summer Lake Rural, Christmas Valley Rural, Paisley Rural, Summer Lake EMS

1

2 The Ana Fire started on July 7 on private land north of the town of Summer Lake
3 and quickly spread under the influence of high winds and dry fuels. The fire
4 threatened approximately 25 homes, 10 commercial buildings, and 10 other
5 structures along with sage-grouse habitat in the Picture Rocks Priority Area for
6 Conservation (PAC), Highway 31, the transmission line that roughly parallels
7 Highway 31, and cultural resources towards the north of the fire. Several rural fire
8 departments along with resources from the Forest Service and BLM responded to
9 the fire.

10 By July 8, Ana Fire had burned approximately 700 acres with hot, windy conditions
11 hampering control efforts. Dense smoke on Highway 31 affected traffic safety,
12 resulting in closure of the highway, the main route between Bend and Lakeview.

13 Lakeview District ordered a Type 2 Incident Management Team on July 9 to take
14 over managing the fire due to the threats to Summer Lake, Highway 31, private
15 timber, and sage-grouse habitat. Ana Fire, now estimated at 3,200 acres continued
16 to burn actively. The Lake County Sheriff's Office issued Level 2 evacuation orders
17 for residents of Ana Estates and homes along Highway 31 two miles south of The
18 Lodge. The national preparedness level increased to 4, indicating firefighting
19 resource shortages developing in several geographic areas.

A Type 2 incident management team assumed command of the fire on July 10. The fire was now an estimated 6,000 acres in size and had burned lands managed by Lakeview BLM and the Fremont-Winema National Forest, as well as state owned lands and private lands. An outbuilding, a barn and a hunter's cabin were believed to be damaged or destroyed by the fire. The fire crossed Highway 31, burning from west to east. Parts of the fire were difficult for crews to reach, hampering control efforts, although crews made good progress on the fire otherwise.

Oregon Department of Transportation was able to reopen Highway 31 on July 11 with pilot cars guiding traffic through the fire area. The team met with cooperators mid-morning and with community members that evening in Summer Lake. Better mapping reduced the estimated fire size to 5,833 acres.

Firefighters continued to improve the containment line on the south flank of the fire, while mopping up on the rest of the fire. On July 12, the team estimated the fire at 5,874 acres and 75 percent contained. The Sheriff's Office reduced evacuation levels to Level 1, although smoke on Highway 31 required continued use of pilot cars for driver safety. Although Fremont Point Lookout was not affected, the Fremont-Winema National Forest closed the site through August 1 to allow unrestricted suppression and recovery traffic in the area. Fire behavior consisted mostly of smoldering under juniper trees and slow burning of interior pockets. Better reconnaissance revealed the number of destroyed structures was only two.

By July 13, crews began conducting suppression repair on the cold parts of the fire. On July 14, the fire was fully contained at an estimated 5,874 acres. The Sheriff's Office lifted all evacuation orders were lifted and normal traffic resumed on Highway 31. The team transferred command of the fire back to Lakeview BLM on July 15.

Hawk Fire

Date of Ignition	July 27, 2017
Cause	Lightning
Land Status at Fire Origin	Vale BLM
Preparedness Level at Time of Ignition	National: PL 4 Regional: PL 3
Fire Size	1,432 acres
Estimated Cost	\$200,000
Land Jurisdictions Affected	BLM
Maximum Resources Assigned	56 Personnel

	12 Engines 4 Water Tenders 1 Helicopters 2 Heavy Equipment
Structures Destroyed	0
Cooperators	Bureau of Land Management, Forest Service, Jordan Valley RFP, Malheur County

1
2 Lightning started the Hawk Fire on July 27 in previously unburned sagebrush within
3 the Cow Lakes PAC, which had tripped a hard trigger due to loss of sagebrush cover
4 and declining sage-grouse population. Jordan Valley RFP was one of the
5 responding units, with five Type 4 engines and three water tenders. Responding
6 resources from BLM included one helicopter, five type 4 engines, one type 6 engine,
7 two dozers, and one water tender while the Forest Service also sent a type 6
8 engine. Several airtankers supported the incident as well. The rapid response
9 resulted in full containment of the fire on July 28 at 1,432 acres.

10 Cinder Butte Fire

Date of Ignition	August 2, 2017
Cause	Lightning
Land Status at Fire Origin	Burns BLM
Preparedness Level at Time of Ignition	National: PL 4 Regional: PL 3
Fire Size	52,046 acres
Estimated Cost	\$4,474,046
Land Jurisdictions Affected	BLM
Maximum Resources Assigned	469 Personnel 16 Crews 27 Engines 11 Water Tenders 2 Helicopters 4 Heavy Equipment
Structures Destroyed	4

Cooperators	Bureau of Land Management, Forest Service, U.S. Fish and Wildlife Service, Oregon Department of Transportation, Harney County Sheriff, Harney County Electric, Silver Creek RFP, Wagonier RFP
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August 2

Human activity along U.S. Highway 20 near Glass Butte started the Cinder Butte fire and it spread rapidly to the south-southeast. The fire initially ran an estimated 15 miles under temperatures in excess of 100°F, single digit relative humidity, 30 mph winds, and an very unstable atmosphere (Haines Index 6) through tall grass, sagebrush, and scattered pockets of western juniper trees. Eight people were evacuated and Oregon Department of Transportation (ODOT) closed five miles of U.S. Highway 20, the main route between Bend and Burns. The fire also affected the 12 Mile PAC and general habitat for sage-grouse, residences, powerlines, and local livestock and was threatening the Eastern Oregon Agricultural Experiment Station and the community of Wagonier.

Responding units included Burns BLM, Prineville BLM, Malheur National Forest, Malheur National Wildlife Refuge, Silver Creek RFP and Wagonier RFP. The Harney County Sheriff handled evacuations, and Harney County Electric deactivated the powerlines in the area. The initial strategy consisted of trying to keep the fire from crossing major roads and protect structures in the area.

August 3

Severe burning conditions continued with high temperatures, critically low relative humidity overnight and into the day, strong winds, and an unstable atmosphere. A Type 2 incident management team was ordered and in-briefed that evening. Additional crews arrived to help with the containment effort. Additional helicopters, single engine air tankers (SEATs), large air tankers, and the DC-10 Very Large Airtanker (VLAT) made water and retardant drops throughout the day. The fire continued to threaten the same resource values as on August 2, along with numerous archaeological sites, including Rimrock Draw, a highly significant site under study by the University of Oregon.

August 4-8

The primary goals for the fire were to continue fireline construction and mop-up and protecting unburned islands and archaeological sites. On August 4 and 5 the fire remained quite active on the south end, including group torching in clumps of western juniper, but had moderated considerably on the north end of the fire. The team found two minor structures that had been destroyed in the initial run of the fire on August 4 and two more minor structures on August 6. By August 5, cooler

conditions moderated fire behavior, although safety concerns related to smoke, traffic, and fire fighter activity continued on U.S. Highways 20 and 395. By August 8 the fire was 90 percent contained with most effort on mop-up and suppression repair and the Type 2 team transferred command to a Type 3 team.

August 9-17

The Type 3 team handled the remaining suppression damage repair and demobilization of firefighting resources between August 9 and 12. After that, a Type 4 incident commander managed continuing patrol of the fire through a warmer, drier, windier period to make sure of no additional flare-ups within the fire perimeter that could threaten the final containment lines. On August 17, the fire was declared 100% contained.

Along with destroying four minor structures, causing the evacuation of 8 people, damaging powerlines, disrupting traffic on U. S. Highways 20 and 395, and burning in four grazing allotments, the fire affected approximately 1,062 acres of the 12 Mile PAC (priority habitat) and 50,984 acres of general habitat for greater sage-grouse.

Significance

These three fires illustrate the importance of rapid responses to protect sage-grouse habitat and the role of RFPAs in that rapid response. Over the course of the summer six wildfires in Oregon burned in priority habitat for sage-grouse (Folly Farms, Picture Rock, Cow Lakes, Louse Canyon, and 12 Mile PACs) and nine fires affected general habitat. Some of the wildfire impacts in southeastern Oregon include:

- 1,575 acres of Sagebrush Focal Area burned
- 8,311 acres of sage-grouse Priority Habitat Management Area burned
- 80,562 acres of sage-grouse General Habitat Management Area burned
- 121 miles of fence lost
- 31 allotments impacted
- 40 grazing permittees affected
- Approximately 5,217 animal unit months of forage unavailable until recovery objectives are met.

Greater sage-grouse are considered an umbrella species for many other sagebrush obligate species, such as pygmy rabbit, pronghorn antelope, and several species of birds and reptiles. Loss of sage-grouse habitat affects habitat availability for these other sagebrush obligate species as well. A sagebrush obligate species is one that requires sagebrush to meet all or part of it's habitat needs, such as habitat for breeding, hiding cover, winter cover, and/or food.

1 Appendix I: Columbia River Gorge National Scenic Area

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1 Appendix J: Blue Mountains (Bear Butte and Desolation Fires)

2 Introduction

3

4 Bear Butte Fire

Date of Ignition	8/4/2017
Cause	Unknown
Land Status at Fire Origin	Wallowa-Whitman National Forest
Preparedness Level at Time of Ignition	National: PL 3 Regional: PL 4
Fire Size	499 Acres
Estimated Cost	\$6,5000,000
Land Jurisdictions Affected	National Forest
Maximum Resources Assigned	Personnel: 165 Crews: 6 Engines: 5 Water Tenders: 2 Helicopter: 2 Heavy Equipment: 2
Structures Destroyed	0
Cooperators	Forest Service, Oregon Department of Forestry, Baker County, Union County, Grant County

5

6

August 4

7 The Bear Butte Fire was reported on the afternoon of August 4 and due to the fire
8 spread and intensity, it was immediately managed as a Type 3 incident. Fire
9 behavior in the initial burn period was observed as short crown runs with long
10 ranged spotting and group torching. Full suppression strategy was chosen as the
11 fire was in close proximity to Anthony Lakes ski Resort, 25 residences and cabins,
12 campgrounds and powerline infrastructure. The fire was burning in high elevation
13 closed timber with thick timber litter understory. The fire behavior was being
14 influenced by high temperatures, low relative humidity and erratic east winds. The
15 quick spread and lack of aerial and ground resources available led to the quick

1 evacuation of the campgrounds and summer homes in the immediate fire area.
2 Approximately 50 people were evacuated in the first burn period. A Type 2 team
3 was ordered the first day of the incident.

4 **August 5**

5 The fire size on August 5 was estimated at 350 acres and had no containment. This
6 incident was surrounded by high values and still had the potential to spread in any
7 direction. Due to the threats, Level 1 evacuations were ordered for the Floodwater
8 Flats, Anthony Lakes Highway, and Anthony Lakes Ski resort. North West Team 9
9 arrived and was in briefed at 1600.

10 **August 6 - August 11**

11 With an influx of resources, to assist fire managers, including line overhead and
12 aircraft, the fire was successfully held at 499 acres. Firefighters constructed direct
13 fireline with the use of dozers and hand crews to catch the fire. The weather also
14 became milder and assisted firefighters with more moderate fire behavior that led
15 allowed for the use the direct fireline strategy.

16 **August 12 - August 24**

17 On August 12, Level 1 evacuations for the Flood Water flat, Anthony lakes ski
18 resort, Anthony lake highways were lifted. The fire was showing minimal fire
19 behavior and was 85% contained. Mop-up efforts continued on the incident through
20 a transition back to the local unit on August 14 and the fire was called 100 percent
21 contained on August 24. Bear Butte Fire was continually mopped up and
22 rehabilitated in areas where deemed necessary for the next three months. It was
23 called controlled on October 2 at 0800. The incident was called out on November 8
24 at 1130 am.

25 **Significance**

26 Bear Butte Fire was the only large fire to be assigned an incident management
27 team in North East Oregon during the 2017 fire season. During a record fire year in
28 the region and with a shortage of resources regionally and nationally, this fire was
29 held at a minimal size while threatening valuable resources.



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Figure XX. Fire behavior during Initial Attack, September 4

Appendix K: Washington (Okanogan-Wenatchee National Forest, Spokane BLM)

Introduction

The 2017 fire season in Washington was unusual in many respects. For one, it actually was a relatively mild season in terms of the number of fires and overall acres burned, unlike Oregon. However, some of those fires had unusual characteristics or outcomes. For another, some large fires occurred in unexpected places, such as the Noisy Creek Fire on the Colville National Forest and the Suiattle Fire near Darrington, WA. Both locations are typically considered too wet to burn, or at least burn readily. Third was the number of human-caused fires. More typically, lightning causes more fires in Washington than people. Lastly, the bigger fires on the Okanogan-Wenatchee, Region 6's main fire forest in Washington, were on the southern part of the forest instead of the central and northern part, with the exception of Diamond Creek Fire.

Sutherland Canyon Fire/Straight Hollow

Date of Ignition	June 26, 2017
Cause	Lightning
Land Status at Fire Origin	Spokane BLM
Preparedness Level at Time of Ignition	National: PL 2 Regional: PL 2
Fire Size	29,258 acres Sutherland Canyon 8,458 acres Straight Hollow
Estimated Cost	\$2,990,000
Land Jurisdictions Affected	BLM, Washington DNR, Private
Maximum Resources Assigned	404 Personnel 12 Crews 43 Engines 8 Water Tenders 1 Helicopter 3 Heavy Equipment
Structures Destroyed	1
Cooperators	Bureau of Land Management, Washington

	Department of Natural Resources, Douglas County Sheriff, Grant County Sheriff, Douglas County, Grant County, Alcoa, Williams Pipeline, The Nature Conservancy
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These two fires developed rapidly from several lightning fires in grass approximately 9-20 miles south of Wenatchee, WA in Chelan, Grant, and Douglas counties. Five of these fires in the Palisades area about eight miles southeast of Wenatchee quickly burned together and were called the Sutherland Canyon Fire. The Straight Hollow Fire was located near East Wenatchee in Douglas County.

Initially Type 3 incident commanders handled each fire, but severe to extreme burning conditions, impacts to greater sage-grouse habitat and evacuations, and steep, inaccessible terrain prompted an order for a Type 2 incident management team. The team took over management of both fires plus the Spartan Fire on June 28. Both fires spread rapidly in the flashy fuels under high winds. Level 2 evacuations were ordered for central Grant County and Level 3 evacuations in the Palisades Road corridor in connection with the Sutherland Canyon Fire.

Since grass-dominated fuels burn out quickly, containment was 50 percent on the Sutherland Canyon Fire and 75 percent on Straight Hollow by June 29. Level 2 evacuations for Grant County were downgraded to Level 1 on June 29; Level 3 evacuations downgraded to Level 1 for the Palisades Road corridor on June 20, and all evacuation orders lifted by July 1. Traffic accidents closed Highway 28 on June 30, making travel to and from Sutherland Canyon Fire more difficult. Sutherland Canyon Fire also burned an abandoned homestead structure. Although firefighters originally thought that Sutherland Canyon and Straight Hollow fires had burned together, better mapping found that they had not. By July 2, full containment was reached for both fires.

Approximately 4,900 acres of greater sage-grouse habitat burned. As part of contingency planning, the team ran three scenarios in WFDSS to evaluate the potential impact to sage-grouse habitat were the fires to escape from one of three locations under the same weather that was present on June 26 and 27. Under the first scenario, the fire was projected to spread an additional 4 to 5 miles and burn an additional 4,900 acres of habitat. Under the second scenario, the fire might travel up to 8 miles and affect 12,500 acres of habitat. Under the third, and worst case, scenario, the fire could travel up to 13 miles, affecting an additional 52,000 acres of habitat.

Significance

The Sutherland Canyon and Straight Hollow fires threatened both sage-grouse habitat and several residences. Typically, sage-grouse habitat is found where human populations are sparse or absent.

1 Diamond Creek

Date of Ignition	7/23/2017
Cause	Human
Land Status at Fire Origin	Okanagan-Wenatchee National Forest
Preparedness Level at Time of Ignition	National: PL 4 Regional: PL 3
Fire Size	128,282 acres 97,140 acres US, 31,132 acres Canada
Estimated Cost	\$11,400,273.18
Land Jurisdictions Affected	Forest Service, British Columbia Ministry of Forest, Private
Maximum Resources Assigned	450 Personnel 7 Crews 18 Engines 8 Water Tenders 6 Helicopter 12 Heavy Equipment
Structures Destroyed	4
Cooperators	Forest Service, British Columbia Ministry of Forest, Okanogan County Dept. 6, Washington Department of Natural Resources, Okanogan County Emergency Medical Services

2

3

July 23

4 On the morning of July 23 a fire was reported deep within the Pasayten wilderness
5 on the Methow Valley Ranger District in very rugged terrain. Investigators later
6 determined the cause of this ignition was an unattended camp fire. Local fire
7 managers' initial response was to use full suppression tactics to keep the fire as
8 small as possible and within the wilderness area. A full load of smokejumpers from
9 the North Cascade Smokejumper Base staffed to fire shortly after it was called in.
10 The fire was ½ acre when initially reported, but within a few hours had grown to 3
11 acres. The fire was burning in continuous heavy dead and down fuels in thick, high
12 elevation forest. The behavior of the fire was creeping, with single and group tree
13 torching and short-ranged spotting. Several aircraft were ordered to make bucket

1 drops along to east side of the fire and multiple crews were ordered the first day.
2 By the end of the July 23 the fire was estimated to be 30-35 acres and an Type 3
3 incident management team was ordered to take command of the fire the following
4 day.

5 **July 24-29**

6 Several handcrews were flown in to assist the smokejumpers in suppression efforts,
7 however, above-average temperatures, low relative humidity, poor overnight
8 humidity recoveries and higher than average wind speeds hampered the
9 containment efforts. As a result, Forest management closed several trails in and
10 around the fire. The fire continued to grow, making significant runs of several
11 thousands of acres on July 28 due to dry cold front passage, resulting in spotting
12 $\frac{3}{4}$ -1 mile ahead of the active front. A short Type 1 incident management team was
13 ordered and took command of the fire on July 29.



14
15 Figure x. Diamond Creek Fire July 28

16 **July 30–September 3**

17 The team's initial strategy with the incident was to keep the fire within the Pasayton
18 Wilderness and protect various spots potentially in the path of the fire. Several
19 cabins at Billy Goat Trailhead and Hidden Lake ahead of the fire were wrapped in
20 fire resistant material and crews prepared the area around the cabins to help
21 protect them if the fire front should pass those areas. Over the next few weeks the
22 fire continued to grow daily within the wilderness and the confine strategy seemed
23 to be the best option for fire managers for fire fighter safety. The weather
24 continued to be hot and dry with dry cold front passages and no significant

1 precipitation. Management of the fire switched from a Type 1 incident management
2 team to a Type 3 team and then to a Type 2 team in the month of August. By the
3 end of the August, a local Type 4 incident commander was handling the fire. In
4 addition to public and firefighter safety, Forest managers were concerned about
5 habitat for lynx, bull trout and northern spotted owls.

6 **September 3–15**

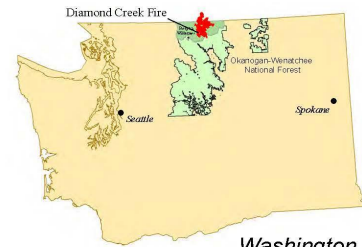
7 By late August the fire had burned around 50,000 acres under the confine strategy.
8 On September 4, it made a significant run, growing to approximately 95,000 acres
9 in one burn period. As a result, the Okanogan Sheriff's Office ordered Level 1
10 evacuations for the communities of Mazama, Lost Creek and Rendezvous. The fire
11 threatened approximately 500 residences and 50 nonresidential commercial
12 properties. However, several other fires in the Northwest also made significant runs
13 on September 4 and 5, resulting in severe resource shortages and Diamond Creek
14 rated as a much lower priority. On September 15 a National Incident Management
15 Organization (NIMO) team would take command of the incident.

16 **September 16-30**

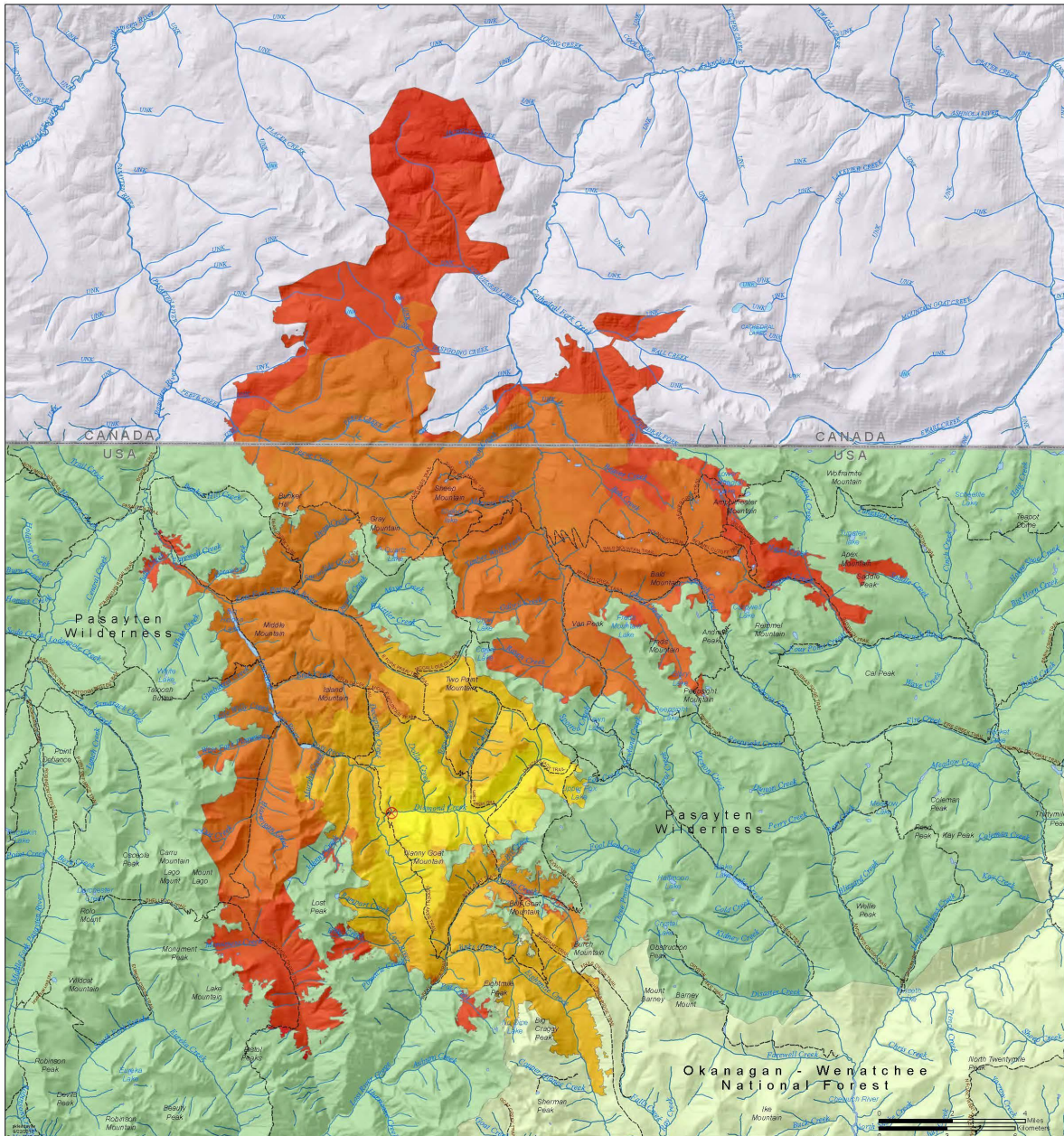
**Diamond Creek Fire
WA-OWF-267
Progression Map
September 27, 2017**



Fire Progression
128,272 acres
7/23/17 9/27/17



Washington



1

2 Jolly Mountain

Date of ignition	August 11, 2017
Cause	Lightning
Land status	Okanogan-Wenatchee National Forest
PL	National PL 5 Regional PL 4
Acres	36,808
Estimated cost	\$24,950,000
Jurisdiction	Forest Service, Washington Department of Natural Resources, The Nature Conservancy
Maximum Resources	831 Total Personnel 21 crews 82 engines 23 water tenders 9 helicopters 10 heavy equipment
Structures Destroyed	0
Cooperators	Forest Service, American Red Cross, Kittitas County Fire Protection Districts 6 and 7, Kittitas County Sheriff, The Nature Conservancy, Washington State Department of Natural Resources, Bureau of Indian Affairs, Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, National Weather Service, Washington National Guard

3

4 Jolly Mountain Fire was detected on August 11, 2017 on the Cle Elum Ranger
5 District of the Okanogan-Wenatchee National Forest. It was one of several lightning
6 ignitions two miles inside the Teanaway Inventoried Roadless Area. Collectively, the

fires threatened campgrounds, commercial buildings and over 500 structures within a high visitation recreation area with major trailheads. The area was also critical habitat for northern spotted owl. Steep slopes, rugged terrain and the distance from road systems limited access to these incidents.

Jolly Mountain Fire quickly grew to 100 acres on August 11 and was at 300 acres by August 12. A Type 2 incident management team assumed command of the fire on August 13 to address fire growth, extremely dry conditions, and the potential threat to residences and nearby communities. Firefighters began to work on indirect control lines in efforts to protect homes, resources, and other values at risk, and the management team used heavy equipment to construct indirect fireline and point protection. By August 18, the fire had potential to threaten 1385 single residences and 1,403 minor structures.

The fire grew modestly for the first 10 days, reaching an estimated 638 acres on August 21, and burning in bug-killed forest. By August 24, Jolly Mountain had grown to 1,735 acres, prompting the team to establish night operations to observe fire behavior and monitor fire effects. That evening, the Kittitas Sheriff's Office issued Level 2 evacuation notices to residents of the Salmon La Sac, Paris Creek and Boulder Creek areas. On August 25, the Sheriff's Office expanded the Level 2 evacuation area to include residents of Morgan Creek, Bell Creek and Timber Ridge communities on Lake Cle Elem. The Forest Service also closed the upper Cle Elem Valley to public access.

A Great Basin Type 2 incident management team took command of the fire on August 26. On August 27, as the fire continued to spread actively under hot, dry conditions, The Nature Conservancy closed their lands on Cle Elem Ridge to public access and Washington Department of Natural Resources closed state lands north of the West Fork and west of the North Fork Teanaway River.

Strong westerly winds on August 30 increased the fire to an estimated 8,000 acres, almost doubling it in size. A day later with acreage now at 11,496, the fire threatened several communities. The Kittitas Sheriff's Office ordered Level 3 evacuation notices for the Teanaway River corridor after the fire made a 3-mile run to the east. Numerous spot fires grew together as well and threw more embers ahead of the main fire. Because of the terrain and fire behavior, firefighters used primarily indirect attack tactics, such as burning out along roads.

Firefighters reported extreme fire behavior September 1-2, such as rapid surface spread, group torching, short crown fire runs, and spotting ¼ to ½ mile ahead of the fire. On September 2, the Kittitas Sheriff's Office expanded the Level 3 evacuation area to include all residents north of the Double O Ranch Road to Boulder Creek and issued Level 2 evacuation notices for the area south of the Double O Ranch Road, including the communities of Ronald and Roslyn. Also on

1 September 2, the Seattle Times ran a story about the Jolly Mountain Fire titled
2 "3,800 Homes in Peril." By September 3, 994 people had been evacuated.

3 Extreme fire behavior continued, with aggressive surface spread, short crown fire
4 runs, flanking, and long range spotting ¼ to 1/3 mile ahead. Night and day shifts
5 reported extinguished numerous spot fires. The Washington state governor
6 declared a State of Emergency over wildfire concerns on this date.

7 "Ash Falls like Snow in Seattle," the Seattle Times reported on September 4. A Type
8 1 incident management team assumed command of the fire and firefighters
9 completed construction of indirect fireline and conducted successful burnout
10 operations to halt fire growth towards communities at risk. The fire was at 20,975
11 acres.

12 By September 5, with 775 personnel assigned, the fire was at 24,514 acres and 5
13 percent containment. On September 6, 128 soldiers and 50 vehicles arrived from
14 the Washington National Guard to assist firefighters, bringing with them mobile
15 day-sleeping barracks for the night shift crews, security personnel, and two Type 2
16 firefighting handcrews. At the time, 45 State-mobilized fire engine structure
17 protection groups continued to assist in protecting homes and communities
18 threatened by the fire.

19 On September 6 with 831 firefighters on scene, the fire had 20 miles of active
20 fireline with structures in close proximity with fuels at record dry conditions. The
21 fire had aircraft, crew, and middle management shortages, and there was extreme
22 fire behavior in this fire and other fires both nationally and regionally. The Kittitas
23 Sheriff's Office issued Level 1 evacuation orders for the town of Cle Elum.

24 By September 7, burning conditions began to ease and crews started gaining on the
25 fire. Cold fronts with cooler temperatures, higher relative humidity, and some
26 moisture began to replace thermal troughs. Firefighters began mop-up on cooler
27 portions of the fire. On September 11, the first phase of evacuation level reductions
28 from 3 to 2 began in the Teanaway area. On September 13, the Sheriff's Office
29 reduced the evacuation level to 2 in the Driftwood Acres and Pineloch Sun areas
30 and did the same for all residents between Bear Creek and Night Sky Drive.

31 On September 18, with the fire 36,808 acres and 40 percent contained, and with
32 significant rain on the fire a Type 3 incident management team assumed command.
33 Over the remainder of September, the Type 3 incident management team
34 completed mop up, backhauling equipment, removing hazard trees along roadways,
35 and repairing damage resulting from fire suppression activities. The fire reached 50
36 percent containment on September 25 and on Thursday September 28 the Sheriff's
37 Office lifted all evacuations orders.

38 **Significance**

1 Jolly Mountain fire burned in a part of the Okanogan-Wenatchee National Forest
 2 that had not had a major wildfire for several decades. Much of the fire was in
 3 inaccessible terrain and resulted in numerous evacuations. The Seattle Times
 4 published two stories as smoke and ash from this fire and the nearby Norse Peak
 5 Fire drifted into the Puget Sound area.

6



7



8

9 Norse Peak

Date of Ignition	8/11/2017
Cause	Lightning
Land Status at Fire Origin	Okanogan-Wenatchee National Forest
Preparedness Level at Time of Ignition	National: PL 5 Regional: PL 4
Fire Size	55,909

Estimated Cost	\$20,000,000
Land Jurisdictions Affected	National Forest, Private, Washington Department of Natural Resources
Maximum Resources Assigned	850 Personnel 8 Crews 36 Engines 6 Water Tenders 4 Helicopter 15 Heavy Equipment
Structures Destroyed	1
Cooperators	Forest Service, National Park Service, Washington National Guard, Washington DNR, Yakima Valley Office of Emergency Management, Nile-Cliffdell Fire Department, Crystal Mountain Fire Department

August 11-13

Lightning started several fires within the Norse Peak Wilderness on the Okanogan-Wenatchee National Forest. The fires were burning in thick continuous high elevation forest with a heavy dead and down from bug-kill in steep, rugged, and remote terrain.

August 14-18

By August 14 there were nine fires burning in the Norse Peak Wilderness with Norse Peak Fire as the largest one. Fire managers estimated the size of all fires together at approximately 500 acres growing to approximately 1200 in the next few burn periods. Because of the fire locations, fuel types, and resource shortages, fire managers chose confinement to the wilderness as the initial strategy. Firefighters began preparing alternative indirect fire lines should the fire make a push out of the wilderness. By August 17 the Yakima Sheriff's Office issued Level 3 evacuations for the Union Creek community and Level 1 evacuations for Goose Prairie and Bumping Lake. Highway 410 was also closed. This fire had several values at risk including 110 recreational residences, threatened and endangered species habitat, the Pacific Crest Trail, the Naches Watershed and the Crystal Mountain Ski area. Fire behavior was extremely active with short crown runs, group torching, and short ranged spotting. Due to values at risk and the complexity of the incident a Type 2 incident management team was ordered and assumed command on August 18.

August 18-27

1 By August 18 fire fighters were conducting in firing operations in the Union Creek
2 cabin areas and preparing indirect line on the Highway 410 corridor. The team's
3 objectives were to confine as much of the incident to the wilderness and to continue
4 point protection and conduct firing operations where necessary. Fire weather
5 reached critical levels with above average temperatures and the passage of several
6 dry cold fronts. The national and regional demand for resources left the incident
7 with many unfilled resource needs including Hotshot crews and Air Attack Group
8 Supervisors. During this time, the fire grew moderately within the wilderness
9 boundary, reaching 2,173 acres and 8 percent containment by August 27.

10 **August 28–September 1**

11 By August 28 most of the state of Washington was under the influence of a thermal
12 trough. The resulting extremely unstable air mass created extreme burning
13 conditions in the Norse Peak Fire area. Temperatures were in the 90s with relative
14 humidity in the low teens. Winds on the afternoon of August 28 reached 15-20 mph
15 on the higher elevations of the fire. These conditions caused extreme fire behavior
16 on the incident and over the next several burn periods the fire grew from
17 approximately 3,900 acres to 17,000 acres by September 1, the same day a new
18 team took command of the incident. The sudden large growth of the incident put
19 Crystal Mountain Ski Area at an immediate threat with the fire within 2 miles of the
20 ski area. It crossed the Pacific Crest Trail and threatened communication buildings
21 on the top of Ravens Roost.

22 **Sept. 2 – Sept. 10**

23 Over the next few operational periods the incident would grow moderately within
24 the wilderness boundaries. However a similar weather event to the one that
25 occurred on August 28, would repeat itself on September 5. High temps, low
26 relative humidity and high winds gusting to 35 would cause the fire to rapidly grow
27 from 20,000 acres to 43,500 acres in just one burn period. This would prompt the
28 additional Level 3 evacuations of Pleasant Valley and Timber Creek. The amount of
29 threatened structures doubled as a result of the run from 110 to 320. But as other
30 fires in the region continued to burn, the availability of any additional resources
31 would be slim. The fire would cross the Pacific Crest Trail to the west and burn its
32 way out of the wilderness immediately threatening the Crystal Mountain Ski Area.
33 The south side of the incident would burn its way down to HWY 410 and be held in
34 check by previous work done to improve the highway. To the East, efforts were still
35 being made to prep roads to burn off of if needed. The fire would continue to burn
36 to the north through the wilderness and be monitored. On September 7th the Army
37 National Guard and Air National Guard would join firefighting efforts. They would
38 supply several hand crews, dispatchers, vehicles, security and helicopters to aide
39 with suppression efforts. By September 10 the fire would be approximately 50,000
40 acres in size and

Sept. 11 – October 30

On September 19 the fire would receive its first significant precipitation as a storm system moved into the region. This would be the first precipitation the fire area had seen in over 90 days. This would happen on the same day a Type 1 team would take command of the incident. The weather event would bring 2-4 inches of snow to some locations on the fire above 5000'. This event would have a large impact on fire behavior and fire spread would be limited for the remainder of the month. Growing to its final size of 55,909 acres. Most of the growth would occur in the wilderness. By September 22, all evacuations would be lifted in the fire area due to the weather event. The change in weather would bring a change in fire objectives. The focus would switch from suppression, mop-up and line construction to fire rehabilitation work. On September 28' the fire would be given back to the local unit to manage. Rehabilitation effort continued for the remainder of the month with two local organizations managing the fire on either side. In early October a Burn Area Emergency Response Team (BAER) would come to the incident to evaluate the post fire threats to the public and to identify mitigation needs for those possible threats. By November 1 the fire was called controlled.



Figure 1 Norse Peak Fire From Ravens Roost